The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

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Contents

NOTICES.—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

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British Chemistry in the Limelight

THE British Empire Exhibition, in spite of delays and anxieties, will, after all, be opened on Wednesday next. The King will perform the opening ceremony, and it is hoped that his tour of the Exhibition may include a visit to the Chemical Section, as on the occasion of the British Industries Fairs. It is to be feared that on the opening day much of the work on the Exhibition will still be unfinished, but among the completed features the Chemical Section will certainly be one. In fact, on the day previous to the opening, there will be a private view open to exhibitors and friends. Not only will the chemical exhibit be ready for the opening date, but one may, with some confidence, express the opinion that it will prove to be one of the best organised, the most attractive, and the most educative in the whole Exhibition.

As Mr. Woolcock truly says in an interview published to-day, the work of organising the Chemical Section has been costly and laborious, but it has been loyally taken up throughout the industry and the results everyone hopes will fully justify the expenditure. What has it been organised for? Shortly, to give to the thousands of visitors from all parts of the world a picture of British chemical industry and science that will long remain in their memory. From such an impression material results may reasonably be expected to flow. To many the range and quality of British products, as well as the remarkable advances made since the war, will come as a revelation, and the business links which cannot fail to be established during the Exhibition can hardly fail either to result in business. The steady work of developing British chemical industry which has been going on for some years seems to us to be proceeding on sound lines. It has aimed primarily at producing goods of first-rate quality, and at building up on this basis a corresponding reputation. It has not been altogether an easy task, for a rather indifferent reputation in some branches has had to be lived down. That has fortunately been done, and from now on, and particularly as the result of the Exhibition, the bias should be in favour of rather than against British chemical products. The tasks that remain are mainly the increase of works efficiency, economy in production, and wisely planned schemes for publicity, sale, and distribution, and gradually, we think, these will be completed. The manufacturers who have combined to make the Chemical Section the success it will undoubtedly be are to be congratulated on their public spirit and enterprise.

Not the least valuable of the Chemical Section features will be the Scientific Section. This will be of a really educative character, and the many eminent scientists who are taking part in it are performing a work of real value. And among the memorials of the Exhibition will long remain that really notable volume "Chemistry in the XXth Century," which some of the best chemical minds of this generation have co-operated in producing.

Oppau Unexplained

ONE point stands out clearly as a result of the investigations into the cause of the Oppau explosion in 1921, which were described before the Faraday Society on Monday, and that is that for the present the problem remains entirely unsolved. This negative result has not been due to any lack of thoroughness in the investigations; on the contrary, it is seldom that any problem has been investigated more completely and with greater skill, and yet the results showed clearly that the Oppau salt, ammonium sulphate-nitrate, could not be detonated under any conditions whatever, though a certain degree of decomposition was obtained in the severest circumstances. This was always less than ammonium nitrate itself would give. The ammonium sulphate portion of the molecule appeared in every case to be entirely inert. In view, however, of the facts of the Oppau explosion, it has been officially recommended that blasting agents should never be used for breaking up the caked salt.

There must clearly be some as yet unknown cause, and one is forced to the conclusion that the particular dump which exploded at Oppau may have contained some impurity of an unusual nature which entirely

disappeared as a result of the explosion. There was no trace of anything unusual in the scattered salt, but this might be expected if it were assumed that whatever substance may have been there was totally destroyed. It is known that certain substances such as oils, pyridine, etc., render ammonium nitrate a dangerous material to handle roughly, and there may well have been something of the kind acting in a similar but much intensified way with the Oppau salt. It is strange from one point of view that there should be no trace of anything unusual in the salt from the adjacent store, but on the other hand, if there had been, it is unlikely that this would have remained unaffected by an explosion of 5,000 tons of material close at hand, which was on such a scale as to cause over 500 fatalities.

An interesting suggestion was made during the discussion at the meeting that it would be possible, from a consideration of the phase equilibrium of the system, ammonium sulphate–ammonium nitrate–water, to form a metastable mixture of crystals, which would revert to the normal state on receiving a shock, with considerable evolution of energy probably of explosive violence. This point would seem well worth investigating; in fact, in view of the large quantities of ammonium-nitrate mixtures which are handled in various ways, no possible explanation should remain uninvestigated. From the statistical point of view, however, it may be a long time before positive results are obtained, because it would appear that only once in some thousands of times is a sample of the salt found with explosive properties, and then when it is discovered it is usually too late for a scientific investigation to be made. Eventually doubtless, and soon it is to be hoped, a sample with explosive properties will come into the hands of some investigator who—should he be fortunate enough to survive—will be able to determine the cause of the irregularity and so settle this baffling question.

Dr. Levinstein's Manifesto

THE letter on the British dyestuffs industry which Dr. Levinstein has contributed to *The Times* is notable for the studied restraint with which his case is stated and for the severely impersonal spirit in which he has discussed matters of profound personal interest to himself. The two central points in the case are (1) that any agreement between British and German dyestuff combines is undesirable ; (2) that if it becomes necessary the agreement should include the British industry as a whole. In support of both these points a considerable volume of opinion has already been expressed, and as both touch the problem on its national side they will come within the jurisdiction of the Government and have to be determined accordingly.

Dr. Levinstein's letter, however, is more than a plea for the national point of view ; it is, though less openly, a general indictment of the policy of the Corporation. Yet one cannot quite see what the alternative policy is to be, unless it means the rather vague claim for "technical" direction and an expenditure on pure research which the present board consider to be unjustified, relatively to equally necessary expenditures in other directions. Some of Dr. Levinstein's figures are new and rather suggestive. "A few years ago," he states, "the British Dyestuffs Corporation made between 75 per cent. and 80 per cent. of the dyes manufactured in this country. To-day that proportion has diminished to between 40 per cent. and 45 per cent. In plain English, they have lost to their British competitors, not to their German competitors, nearly half of the trade which ought to have come their way." Accepting these figures as accurate, is it not a little significant that when the Corporation was producing 75 to 80 per cent. of the total output of British dyes it was losing money, while to-day on an output of 40 to 45 per cent. it shows a profit of a quarter of a million. What is the explanation of so curious a position ? It looks to us rather like better management and higher works efficiency—the result of a deliberate policy of confining the range of products to those which can be made efficiently and profitably, in preference to the earlier policy of undertaking too wide a range and sacrificing quality to quantity.

But we must not rush into the details of a controversy, which is essentially one for the experts, in front of the angels. Dr. Levinstein has every right to be heard on this subject, and he has stated his views with ability and frankness. With his closing words, at least, everyone will agree—that "those whose consent to this arrangement is necessary will do well to act cautiously and not to make irrevocable decisions on arguments which may be partisan or upon facts which may be inaccurately or incompletely stated."

Common Sense and the Coal Dispute

AT the commencement of the year the majority of us were anticipating that we should be spending Easter in the throes of a miners' dispute, and for some three months those who depend for the continuance of their activities on an uninterrupted supply of coal have been accumulating stocks at, in many cases, prices well above those which would have ruled had not the situation borne so threatening an appearance. The experience of the present year has been more than sufficient to quell any shallow optimism we may have had of effecting a settlement without a fight ; but, although the outlook in the coal industry is still obscure, there are indications that the dispute will not be pushed to the breaking-point. The miners, who were asked to vote for or against the rejection of the employers offer of 32½ per cent. above the wages prevailing in 1914 (the men themselves asked for 40 per cent.), have rejected the owners' suggestion, but this does not involve a stoppage, as both sides have agreed to their case being considered by a statutory Court of Inquiry which, as in the case of several recent disputes, is to be set in motion immediately by the Government. Meanwhile, a temporary arrangement between owners and miners has been arrived at, and even should the parties not agree to accept the findings of the court, and should further negotiations fail, there must, before a strike can be declared, be another ballot of the men giving a two-thirds majority in favour of a strike. Large industrial coal consumers will at least be gratified to find that Mr. Roscoe Brunner has been appointed one of the three members of the Court of Inquiry.

The immediate result of the ballot which was announced a week ago is that in the coal trade there is already a distinctly better outlook which is being reflected in other directions. For three months our industries have been living in a state of suspense, fearing the worst, and making their plans accordingly. Even a surface analysis of the recent ballot, however, inspires a good deal of confidence in the common sense of the rank and file of the industry. The terms were rejected by a trivial majority, but one finds that scarcely a third of all the miners employed regarded the question of sufficient importance to demand their attendance at the polling booths. Another significant fact is that while the feeling of two-thirds of the miners was obviously one more or less of apathy, nearly one half of the remaining third directly disregarded the recommendations of their delegates who advised rejection of the terms. If, therefore, any reliable deduction whatever is to be drawn at the present moment it would seem to be fairly clear that the miners are not altogether unmindful of present-day difficulties in a business which is subject to world competition, and it is, perhaps, not too much to say that the least likely thing we shall see is a repetition of the folly of 1921. Our competitors are by no means blind to the opportunities which uncertainties and suspense such as we have been surrounded by during the past three months provide for them, and the recent abnormally heavy shipments of American and German coals to continental and other markets which should be ours cannot pass unnoticed by the miners and those whom they elect to advise them. The whole question would, in fact, seem to reduce itself to one of elementary common sense.

Chemistry House Scheme

As far as one can judge from personal and semi-official views, opinion seems to be moving in favour of the proposals stated by Dr. E. F. Armstrong in our last issue for starting a Chemistry House scheme on a limited scale. The Chemical Industry Club has already declared itself in favour of the principle of some such plan, and if the various societies can be induced to do the same, without committing themselves prematurely to details, the way will be at once clear for definite action. Not only, within a comparatively short period, may we see the staffs of a group of chemical organisations working in close association under one roof, but in the process a federal council may be gradually created, which will be an effectively representative body and will be able to act with an authority the present council has not yet acquired. This, we trust, will not be taken as an unfriendly view of what the Federal Council has done. In the early stages the initiative often has to be taken by individuals largely on their own authority, but as the organisation proceeds the representative principle comes gradually into force, and the machinery of constitutional government is built up. The Chemistry House scheme is not only good in itself; the co-operation of the various bodies in putting it into force may lead to an important advance in our ideas of federal action and in the machinery for making them operative.

Chemical Trade in March

Foreign trade in general during March has, as revealed in the official statistics, not been quite so favourable as during the previous months, although there has been a maintained increase in imports. The trade in chemicals has reproduced in miniature the general situation, as an increase in imports has also been shown, amounting to £408,000 over the February figures, and £50,578 compared with March last year. Exports have decreased compared with February from £2,352,000 to £2,034,000, but are still above last year's figure by £122,000. With such a slight increase in the quantity of imported chemicals it is not surprising that there is no outstanding individual change, but in view of the general tendency the reduced quantity of nitrate of soda received is rather notable, as this amounts to over 110,000 cwts., or a total of less than half last year's figure. Exports conversely show the biggest change on the increase side, with sulphate of ammonia, benzol, naphtha, and carbolic acid outstanding. It is noticeable that for the first time for many months the exports of synthetic coal tar dyestuffs are lower than a year ago, having dropped to 7,000 odd hundredweight. This figure is considerably lower than the average of the past twelve months, and it is to be hoped that is only a temporary set-back to the overseas development of the products of British dye industry.

Points from Our News Pages

Our special Empire Exhibition features include an interview with Mr. W. J. U. Woolcock, the general organiser of the Chemical Section (p. 402) and a plan of the arrangement of the chemical exhibits (pp. 404–5.)

An account is published of the discussion held by the Faraday Society on the investigations into the cause of the explosion at Oppau in 1921 (p. 408).

The official trade returns for March show an increase in chemical imports, while exports are maintained (p. 412).

According to our London Market Report Continental prices continue to advance, and a high standard of values is to be expected (p. 418).

Business has been very quiet in the Scottish Chemical market according to our report (p. 421).

The Calendar

Apl. 23	British Empire Exhibition; Opening ceremony, 10.30 a.m.	Wembley Park, London.
28 to May 9	British Industries Fair	White City, London.
2	Institute of Metals (Swansea Section) Annual General Meeting. 7.15 p.m.	University College, Singleton Park, Swansea.
2	Society of Chemical Industry (Manchester Section): "Insulin." Arnold Renshaw. "A Recent Bleaching Agent for Flour and the Detection of Persulphate in Flour." J. Miller.	16, St. Mary's Parsonage, Manchester.
5	Society of Chemical Industry (London Section): Ordinary Meeting. 8 p.m.	Burlington House, Piccadilly, London.
6	Northern Polytechnic Chemical Association: "The Organisation of Research in a Chemical Works." Dr. H. A. D. Jowett. 8 p.m.	Holloway, London, N.
12 to 23	British Industries Fair	Castle Bromwich, Birmingham

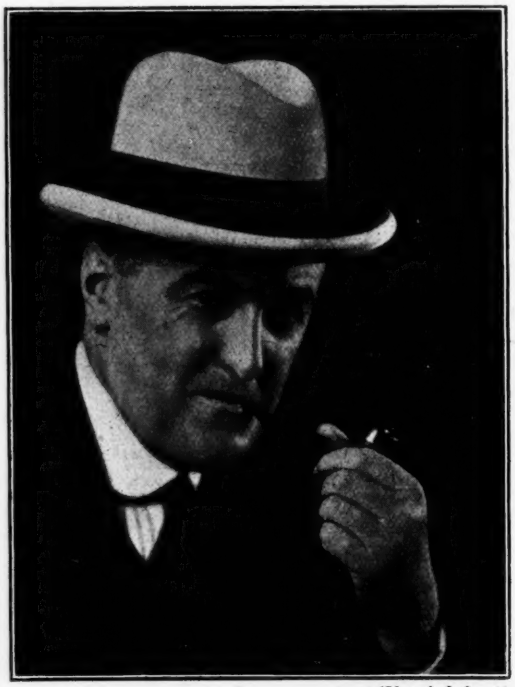
Chemistry at the British Empire Exhibition

A Chat with the General Organiser

"Will it be ready?" I asked Mr. Woolcock when I found him in the Chemical Hall; and as he hesitated for a reply I wondered how many times that day the same question had been put to him. The explosion I expected did not follow; his reply was "It is still possible." I realised if the interview were to be fruitful I must ask questions which were not as badly worn as this one. "Tell me how it all started," I said, and this is the story I got:—

Towards the end of the summer of 1922 Mr. J. J. Scott, a member of the Exhibition staff and an old friend of Mr. Woolcock, appealed to the Association of British Chemical Manufacturers for assistance in getting the industry interested in the Exhibition. The Association had organised the Chemical Section at the British Industries Fair of 1922 and was preparing to do the same for the 1923 Fair, but the Council felt that something very much bigger and better was required for the Exhibition. There was, however, very little enthusiasm among British industries about the Exhibition and it was necessary that one of them should give a clear lead. The Council decided that Chemical Industry should do this.

The first step was to secure the co-operation of the scientific societies, and it is this co-operation so readily given which distinguishes this Exhibition from all others. With the Association of British Chemical Manufacturers alone in the scheme it could be nothing but a trade exhibit, a magnificent trade exhibit if you will, but still a trade exhibit. As the project took shape it fell naturally into two sections—the industrial and the scientific. What was considered an absurdly large space — 20,000 square feet—was provisionally ear-marked for chemical industry, and a few of the leading firms took about 7,000 square feet of this to encourage the others. As the campaign progressed the 20,000 mark was passed, then the 30,000, and finally the limit of 40,000 square feet was reached, which was as much as could be fairly allotted to chemical industry. The business of "encouraging" firms to come into the scheme was reversed; some firms were asked to give up part of their space and even then many applicants for space were turned away.



(Photo. by Lafayette)

Mr. W. J. U. Woolcock
(General Organiser of the Chemical Section of the British Empire Exhibition).

"All this," said Mr. Woolcock, "is common form. You start by begging for assistance, and you are ultimately overwhelmed with demands to participate. There has been nothing so typically British as the organisation of the British Empire Exhibition. We appear to have decided that it was necessary to show the world what the Empire can do in commerce and industry. Having got as far as that the exaggerated diffidence characteristic of the Britisher when he is going to talk about himself came into play. We seem to have determined that if we are to have the greatest exhibition the world has ever seen, we will at least handicap ourselves in every possible way while we are doing so. We have succeeded. There has been nothing left undone to spoil the project. Short of an earthquake, I cannot think of any further handicap which can be imposed. There have been troubles in administration, faulty organisation, strikes, a severe winter, trade depression, and everything else; and yet I believe the Exhibition will be a great success. It is the triumph of the right idea over all obstacles, whether self-imposed or not."

"But why exactly is it that the Chemical Section has attained such prominence quite apart from chemical circles?" I asked.

"There are many factors I must mention," he said, "if I am to answer that question categorically. The early decision that chemical industry would take part enabled us to secure the best position in the Industrial Hall; it also enabled us to put our contractors in on the very day the Palace of Industry was handed over to the Exhibition authorities. The spirit in which the exhibitors in the Hall have worked together has materially helped. The meetings we have had when the editors of all the technical journals have met around a table for the first time in their lives and given us the benefit of their united advice . . ."

I hastily turned the conversation by saying, "What about the scientific societies?"

"Yes," said Mr. Woolcock, meditatively, "that is the real thing. They brought us the idea. The industrial section was well begun when the representatives of the societies commenced their meetings under the chairmanship of Dr. Levinstein. It was they who conceived the idea of demonstrating the soundness of the scientific basis on which the industry rests. You must remember that at that time the Government were giving no assistance to enable pure science to be represented in the Exhibition. We determined that chemistry should be there anyhow. Later, a small sum of money was placed at the disposal of the Royal Society and an eminently sensible arrangement was arrived at whereby the Royal Society utilised this money for the other sciences and we relieved them of the responsibility for chemistry. The cordial co-operation between the committee of the Royal Society and the committee of the other scientific societies has been one of the most restful features in a somewhat hectic bit of organisation.

"But to return to the Scientific Committee. Their central idea was to demonstrate the soundness of the work being done in chemical science. They proceeded on two lines. The first was the exhibit you will see displayed in the Scientific Section in the Chemical Hall. It will speak for itself. I only want to pay a tribute to Dr. Levinstein

for his conception and handling of the scheme and to that singularly able, and developed body of men who have arranged the various sub-sections. The second was that unique production 'Chemistry in the XX Century.' At one of the early meetings Dr. Armstrong put forward a scheme for accompanying the exhibit with some literature. His idea was that every chemist who saw the exhibit would want a record of the work which the exhibit illustrated, and those scattered over the face of the globe who could not see it would welcome the chance of obtaining such a record at a very moderate price. Here, again, the scientists rallied to the call in a remarkable fashion. It was produced in record time. In this case the handicap chosen was an epidemic of influenza among the printer's staff. This meant that Dr. Armstrong's work as editor was divided into periods of "no proofs" and intense disappointment and "too many proofs" and only twenty-four hours in the day to read them. However, it is done; and I predict for the book the widest circle of readers of any book of this kind which has been published. "There is also in preparation for the general public, and I hope for the school boy in particular, a series of pamphlets in popular language edited by Dr. Miall."

My last question was "What is the cost of all this?" To which Mr. Woolcock replied: "If you refer to the book I must tell you that the scientists who have written the monographs have done so without fee or reward, but as a contribution to the Empire. The conveners of the sub-sections in the Scientific Section have likewise spent themselves. The scientific societies have contributed towards the expenses of the Scientific Section which will cost about £6,000. The whole of the Chemical Hall exhibits will cost the industry rather over £100,000."

I left Mr. Woolcock in the midst of what looked to me like choas (it was eleven days from the opening date), yet as I walked away I had a feeling that with such support as he has been receiving the Chemical Hall is bound to be a great success. F. E. H.

Some Preliminary Impressions

THE British Empire Exhibition at Wembley will be opened by the King on Wednesday of next week. In many ways a unique exhibition, especially in view of the scale on which it has been supported by our Overseas Dominions, there is no doubt that one of the outstanding features of the British Exhibits will be the chemical section. There is a unity and artistry about this section which is sure to attract attention, and taken in conjunction with its excellent position it cannot fail to be seen and remembered by the vast majority of visitors. As is now well known, the section occupies the north-east corner of the Palace of Industry, one of the two great buildings in which the majority of the British exhibits are housed. As a matter of fact the section extends half the length of the eastern side of this building and inwards as far as the first main corridor, occupying nearly 40,000 sq. ft. At first sight this area seems almost more than the size of the industry warrants, and it was feared for a time that it might not be possible to do justice to the site; but this fear has proved entirely groundless, there having been ultimately so great a demand for space that some prospective exhibitors could not be accommodated. There is no doubt that the present arrangement will demonstrate in the clearest manner the great fundamental importance of the British chemical industry, as well as confound those critics who represent it to be a contemptible affair.

The great distinguishing feature of the chemical section arises undoubtedly in the fact that it is separated from other exhibits by a white partition wall surmounted by Mr. Cosmo Clarke's decorative frieze. It must not be imagined that there is anything in the nature of a blank wall—it has numerous archways showing the stands inside, while the exhibits bordering on this partition give the impression of overflowing outside it. Thus in effect the wall stands back from the main corridors with some of the stalls outside, arranged in some cases as artificial gardens enhancing the resemblance to a block of houses with gardens in front. The frieze, which is brightly coloured and represents in an impressionist style all phases of the chemical industry, pulls the whole scheme together, to employ another simile, much as a coloured ribbon round a box of chocolates. In the plan of the chemical section reproduced in this issue the partition walls are indicated by the heavy black lines. Except, of course, in the case of the exterior walls of the Palace of Industry along the lower edge and right-hand side of the plan, these walls do not extend the full height up to the roof, as may be seen from the illustrations published in our issue of March 29.

Reference to the plan shows that in the main the exhibits fall into four groups, being from south to north—soap and perfumery, fine chemicals, heavy chemicals, and dyestuffs. As a kind of inner sanctum the Association of British Chemical Manufacturers has arranged with a number of eminent scientific men for a special Scientific Sub-Section, designed to show the fundamental scientific basis of the British chemical industry. The main features in this section have already been dealt with, and in this number there appears a detailed review of some of the prominent exhibits. Both the scientific and commercial sections of the chemical exhibit do not belie in actual fact the good impression produced by their distinctive appearance. An immense amount of work has been done to show that British chemistry is an essential fundamental industry in our modern life and that it is in a healthy and flourishing condition. It is no exaggeration to say that never before has there been anything approaching the present display; a mere glance at the names of the exhibitors participating shows that there has never previously been anything so thoroughly representative of the wide scope of the industry.

Wembley: A Fortnight Before

Impressions of a Premature Visit

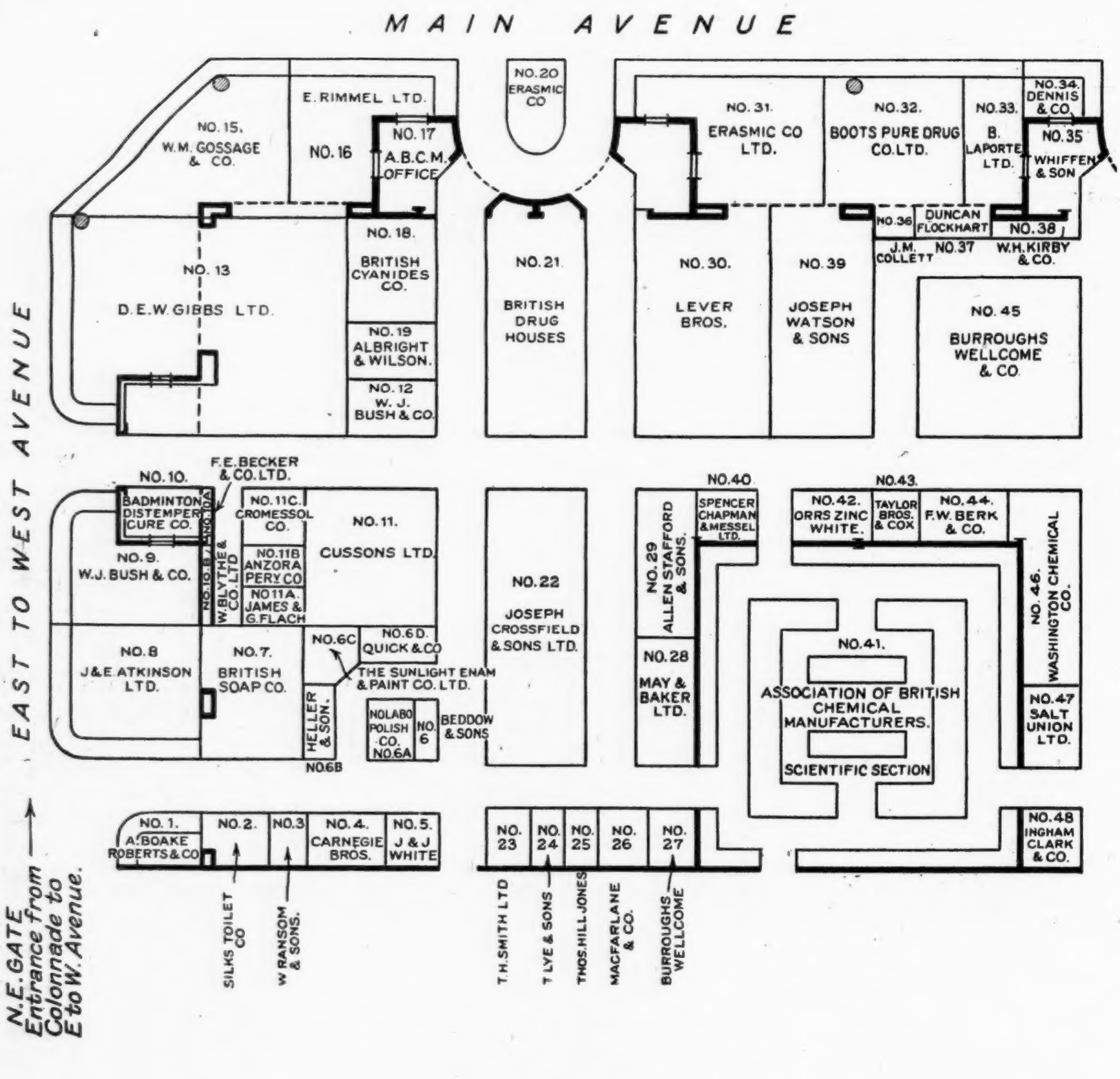
Wembley Park Station! They have enlarged this tremendously and built a covered way right into the exhibition. The Stadium stands out straight ahead, on the hill. There is an immense amount of work going on still at the entrance, making the roadway with steam rollers, broken bricks, stones, and asphalt. The gardens are certainly going to be very nice. The chemical section is in the Palace of Industry, just in front on the right. Into the other building on the left, first though, not the exotic looking restaurant—J. Lyons and Co., soda fountain, etc.—but the grey concrete one. It is about the size of Waterloo Station, the Palace of Engineering, of course. There is a huge overhead crane or gantry, moving exhibits into place, with a large notice "Babcock and Wilcox, 25 tons," on it. This is Avenue 11, apparently. There seem to be some railway engines at the far end away to the left. These are all done up in sacking. Also some Pullman cars. Otherwise it is still mainly packing cases. It will be hard work to get it all ready for the 23rd. There is another avenue and travelling gantry—"Avenue 10." Are there eleven altogether? No, only five and then a few short ones; the method of numbering seems mysterious, though. May as well go on now; these packing cases are not very exciting. The gardens are certainly very effective. Lorries and steam rollers are still very busy. That is the Palace of Industry opposite—PAL in gold letters on it, very nicely proportioned, a distinct improvement to the appearance of the building. The buildings are much neater and more suitable than the old White City style.

The Chemical Section

In at the north-east door of the Palace of Industry there is the Chemistry Section on the right. It seems much more finished. It does look well, too. That frieze is a great idea, pulls it together so. This part really does look as though it will be ready by the opening day. Some of the stands are

(*Continued on page* 406)

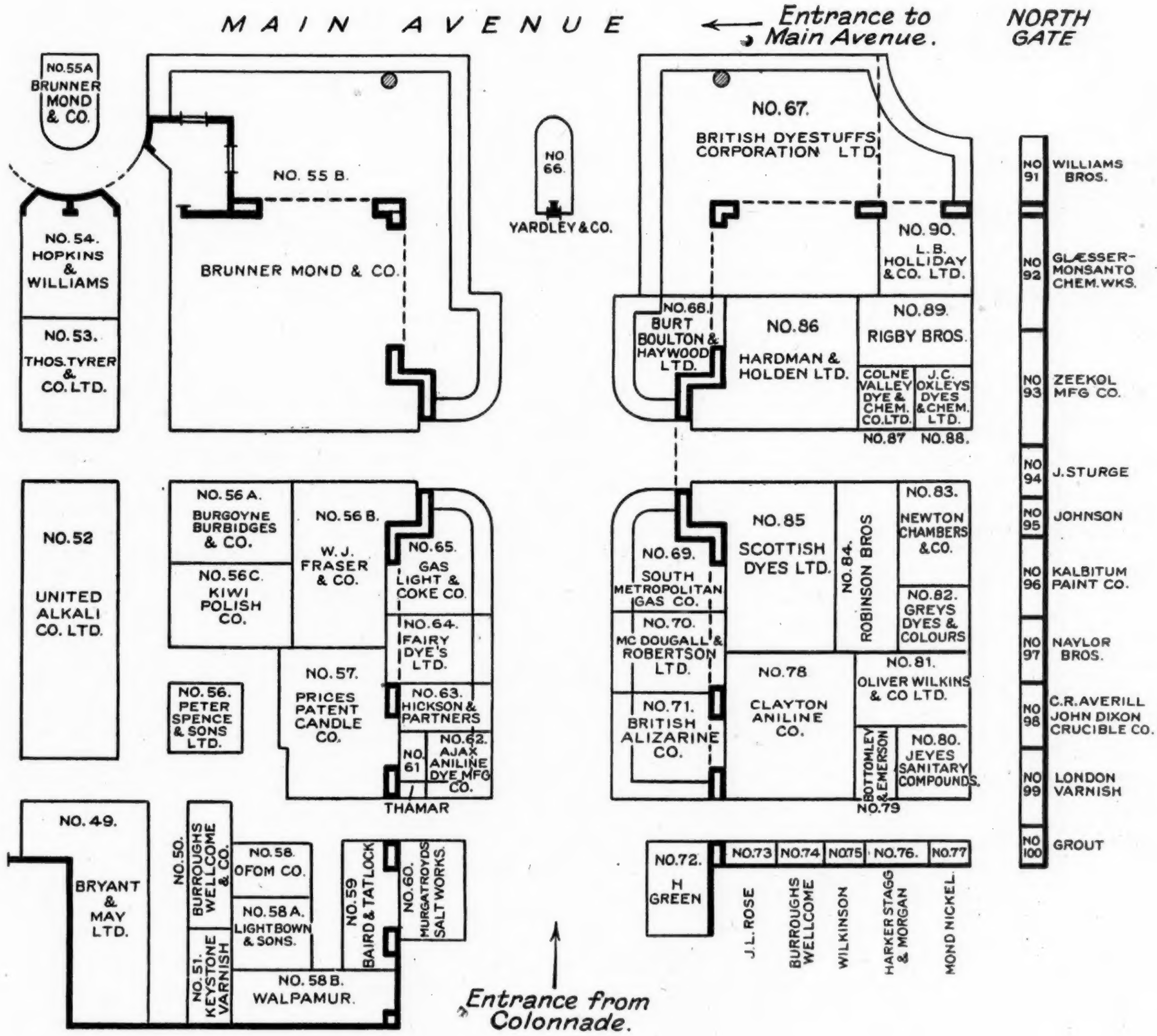
Ground Plan of Chemical Section—



Notes on Chemical Section Plan

The ground plan published above of the Chemical Section at the British Empire Exhibition shows the exact position of the stands of the various exhibiting firms. The North Entrance, which is reached most easily from the Wembley Park Station side, leads direct into the main avenue. On the left of this avenue is the Chemical Section, which extends as far as the East-to-West Avenue and thus occupies one large corner of the Palace of Industry. The Section may also be entered from entrances from the Colonnade, one leading directly into the exhibits and the other to the East-to-West

—at the British Empire Exhibition



Notes on Chemical Section Plan—*continued*

Avenue. The boundaries of the Chemical Section are thus provided by two main avenues crossing each other at right angles.

The situation of the Chemical Section has been admirably chosen. It forms a distinctive unit in itself, self-contained and so arranged that all its parts are easily accessible. The distinctive effect is heightened by the mode of treatment and decorative scheme. The coloured frieze, running along the top of the stands, serves as a broad ribbon to bind the exhibits together into one body, and the general effect promises to be bright, unified, and thoroughly distinctive.

(*Continued from page* 403)

finished already. The Palace of Industry seems more advanced all round. The stands are of all shapes and styles, some of them very effective. The Chemical Section stands out as something quite distinct, though. Everyone will notice it at once. It has the advantage of light too. The sun will shine on it through the glass roof nearly all day. That combined with the white paint, the frieze and grouping of the stands, makes it the most effective thing in sight.

Australia, Canada, etc.

There are other things to be seen in the exhibition as well Australia for instance. On the way to Australia the Great Lake must be crossed. The bridge is rather Japanesy, but there is a very effective vista through these bridges to what is obviously the Indian building. But Australia is near at hand. "Have you a pass, sir?—You must have a pass from Australia House, no one is admitted without!" There must be some very special surprise in Australia, perhaps a radio-activated kangaroo farm or something, who knows? There is a large building that looks like a mud hut. What is it? "Gold Coast." Inside there is nothing but grass apparently, and that notice in the distance, "Bass, in all bars," destroys the illusion entirely. Here is Canada, and no one to bar the way, which is just as well, as it is beginning to snow, appropriately. Canada is nearly ready. There are manufacturers' exhibits of furniture, engineering and all sorts of things. The Dominion Tar and Chemical Co. have a model forest and railway. Then there are models of orchards, prairies, mountains and even the Niagara Falls worked by electricity, a strange inversion of Nature.

It is still snowing outside, obviously unsuitable weather for visiting India and other tropical countries, besides, it is getting very muddy with the roadways still unfinished. Nothing is really finished, but most of it may be. Lyons restaurants are the exception, they are already flourishing, in three grades to suit various pockets. There are to be 7,000 waitresses altogether, so there should be no lack of catering facilities. In any case Wembley will be very well worth visiting, and given reasonably decent weather this summer it will be a very delightful place indeed. ARGON.

Exhibits in the Scientific Section

The exhibits in the Scientific Sub-Section of the Chemical exhibit at Wembley have been assigned by the Association of British Chemical Manufacturers as follows:—

The Structure of the Atom, and Spectroscopy, in conjunction with the Royal Society; Crystallography, Sir Henry Miers, F.R.S.; Colloids, Professor J. W. McBain, M.A., F.R.S.; Photography, Dr. T. Slater Price, F.I.C.; General Physical and Inorganic Chemistry, Professor Donnan, F.R.S.; Alloys, in conjunction with the Royal Society; Rare Gases, Dr. M. W. Travers; Flame, Fuel and Explosion Waves, Professor A. Smithells, F.R.S.; Alkaloids, Dr. T. A. Henry and Professor F. L. Pyman, D.Sc., F.R.S.; Biochemistry, Mr. J. L. Baker, F.I.C.; Agricultural Chemistry, Sir John Russell, D.Sc., F.R.S.; Sugars, Principal J. C. Irvine, C.B.E., F.R.S.; Terpenes, Professor G. G. Henderson, F.R.S.; Colouring Matters, Dr. J. T. Hewitt, F.R.S., and Professor I. M. Heilbron, F.I.C.; General Organic Chemistry, Professor J. F. Thorpe, F.R.S.; Bleaching and Dyeing, The Society of Dyers and Colourists; Cellulose, Dr. C. F. Cross, F.R.S.; Explosives, Sir Robert Robertson, F.R.S.; Plastics, Dr. W. R. Ormandy, F.I.C.; Apparatus, Professor J. W. Hinchley, F.I.C.; and Historical Exhibits, Mr. R. B. Pilcher.

Progress in Explosives

Sir Robert Robertson's exhibit is designed to show the progress made in the manufacture of explosives in the two periods 1900–1914 and 1914–1924. Dealing first with the earlier period, three scale models made by Messrs. Fraser illustrate improvements in manufacture introduced about the beginning of this period at the Royal Gunpowder Factory. The displacement process for making nitroglycerine of Nathan, Thomson, and Rintoul is shown in a model in which the protecting mounds for the houses are partially cut away. This process led to increased safety and economy in manufacture, and height was saved in erection of a factory. A model of an acetone recovery factory shows the process of Robertson and Rintoul for extracting acetone existing in the state of vapour in air, and recovering it for use again as a gelatinising solvent in the manufacture of cordite.

Research in this period is illustrated by Robertson's apparatus for following the decomposition of nitroglycerine by the spectroscopic estimation of the nitric peroxide evolved, and Farmer's apparatus for determining the stability of high explosives in an evacuated vessel by means of mercury manometer is shown. Calorimetric apparatus is shown by which McNab and Leighton determined the heat values and gases evolved from shot-gun propellants, and estimated the relative temperature of explosion; also the calorimetric bomb used by Robertson for determining the effect of the non-explosive constituents on the calorimetric constants of cordite. An example with diagram and description is given of Petavel's recording manometer for registering by an optical device the rise and fall of pressure in a closed vessel in which a propellant is fired. Methods of nitration are also illustrated.

Explosives manufacture during 1914–1924 includes the War period, during which at one stage there was a weekly production of 2,000 tons of cordite, 1,500 tons of trinitrotoluene, 3,000 tons of ammonium nitrate, 300 tons of picric acid, and 200,000 tons of nitric acid and of sulphuric acid. As the supply of acetone, the gelatinising solvent for cordite, failed, a new propellant (cordite R.D.B.) was brought out by the Research Department, Woolwich, in which that solvent was replaced by ether-alcohol and the ingredients altered in an appropriate manner so as to obtain the same heat energy and ballistics from the propellant. For the manufacture of trinitrotoluene, a process with several novel features was evolved at the R.D. Woolwich, before the end of 1914, and demonstrated in a quarter ton experimental plant. This process was used in the T.N.T. factories of Oldbury and Queensferry erected by Mr. K. B. Quinan. A photograph of the small scale plant which exemplified the advantage of experimenting on an intermediate stage between laboratory process and production on the large scale is shown. To conserve the supply of T.N.T. a mixture of T.N.T. and ammonium nitrate was worked out as a high explosive early in 1915 in the R.D. Woolwich, and its properties determined; the name of amatol was given to it. The ammonium nitrate is not a diluent merely, but is in itself an explosive; it contributes to the mixture oxygen, which it has in excess, while T.N.T. is deficient in this respect. Amatol was ultimately the sole high explosive for the Land Service, 4,000 tons a week being made, and it was adopted by the United States.

A wall case contains examples of the raw materials and intermediate products for the manufacture of high explosives, and their relationship is indicated by a system of arrows.

Research in the period is also shown by a number of exhibits, among which the following may be mentioned. To determine the sensitiveness of explosives without leaving the interpretation of personal conjecture, apparatus shown by a diagram was devised by Rotter, the completeness of the explosion of the material on an anvil, struck by a drift working in a closed vessel, being indicated by the volume of gas evolved as shown by a manometer. An important development in determining the pressure given by explosives when they detonate was the application of the principle of Hopkinson's pressure bar by Quinney at R.D. Woolwich, of which one of the early types is shown.

Models of Crystal Structure

Professor W. L. Bragg is showing models to illustrate the crystalline structures of elements and inorganic compounds. The models are made to an exact scale of one hundred million to one. The positions of the atoms in the crystals relatively to one another, and the symmetry of the patterns which they form, are shown by the balls, each representing an atom, of which the models are made. The signs of the balls indicate approximately the regions occupied by the electronic systems of the atoms. The models represent crystals of the elements, such as carbon, arsenic, selenium, and the metals; also of compounds such as common salt, zinc-blende, iron pyrites, calcite and aragonite, and aluminium oxide. A more complete description of the interesting features in these structures is given with each exhibit.

Coal and Flame

Visitors who are not acquainted with the appearance of the four constituents of an ordinary coal will readily recognise the fusain, durain, clarain, vitrain in their own coal scuttles after inspection of the samples exhibited by Professor A. Smithells.

Powdery fusain, hard dull durain, bright clarain, and brilliantly shiny vitrain are easily distinguished by eye, once attention has been called to them. Photographs of the micro-structure of the four constituents, and exhibits of the various types of coke which they provide, are supplemented with charts showing how the composition of coal determines its utility for various purposes.

There are photographs to show the mode of travel of flame in explosive gas mixtures. Apparatus used for investigating the conditions of ignition of gases is exhibited, together with charts illustrating the results obtained. Other apparatus shows how the two cones of a non-luminous flame were first separated. There is also an exhibit of the device used for the flameless combustion of gases, the object of which is to improve the efficiency of gas heating.

Sir Ernest Rutherford is showing a number of exhibits from the Cavendish Laboratory, Cambridge, which illustrate some aspects of radio-activity and their bearing on atomic structure. These show (*a*) The nature of the alpha particle; (*b*) the counting of alpha particles; (*c*) Beta and gamma rays from radio-active substances; and (*d*) work of Moseley on atomic numbers. There is also an exhibit by Mr. C. T. R. Wilson showing the scattering of alpha particles, and one by Dr. F. W. Aston showing various facts about isotopes by means of (1) photographs of typical mass spectra 16 in. by 12 in.; (2) a diagram showing principle of the mass spectrograph; (3) photograph positive ray parabolas of neon.

Plastics and Metallurgy

Dr. W. R. Ormandy has an interesting exhibit consisting of (1) 20 bottles exhibiting various stages in the conversion of cellulose into sugar by two modifications of the acid hydrolysis process; (2) an exhibit of phenol and cresol condensates at various stages with various condensing agents from Synthite, Ltd., West Bromwich, and (3) from Damard Lacquer Co., Birmingham; (4) a small exhibit from Erinoid Co., of Stroud, showing products produced from casein converted into a plastic mass by pressure and stabilised by formaldehyde; (5) the original apparatus used by Mr. Ackermann for his work on the pressure of fluidity.

The outstanding features of the exhibit by Professor F. C. Thompson, of the Metallurgical Department of the University of Manchester, and W. E. W. Millington, Esq., M.Inst.C.E., M.I.Mech.E., are the models and illustrations dealing with the effect of working both hot and cold on the crystalline structure of metals. The mechanism of plastic deformation is revealed, and some of its bearings suggested. In particular an explanation of the "fatigue" of metals is offered.

Other exhibits include samples of metallic ingots illustrating the crystallisation of metals and the effect of the casting temperature on this. Photomicrographs of the structure of metals and alloys are included.

Professor Hinchley has a number of exhibits in Chemical Engineering, including two model evaporators, model of phosphate den, premier mill, centrifugal machine, and a set of stoneware models of chemical plant.

Perkin's Mauve

The most interesting part of Professor J. T. Hewitt's exhibit will be that of original specimens of artificial dyestuffs prepared by the late Sir William Perkin and skeins dyed with original mauve. Further, Professor A. G. Perkin is showing specimens illustrating his researches on the constitution of natural dyestuffs. The exhibits will also include those from Professor Heilbron, Dr. Everest, Dr. Silberrad, British Dyestuffs Corporation, and L. B. Holliday and Co., Ltd. Dr. Everest is exhibiting a very interesting collection of plant pigments, the so-called anthocyanidins which he has himself extracted from flowers and the constitutions of which have been determined. In addition the dyeing properties of these is well exhibited on specimens of silk skeins. Professor Hewitt's personal exhibit comprises some sixty specimens of styryl pyrylium salts which are closely related to the flower pigments themselves. The wonderful colour of these in solution is also being shown.

Professor G. G. Henderson has an exhibit dealing with the terpenes, among the most interesting points of which are those sent by Professor W. H. Perkin illustrating the synthesis of limonene, the first of the naturally occurring terpenes to be prepared by synthetic methods, and of epicamphor, the interesting isomeride of ordinary camphor. Professor Henderson will also show specimens illustrating the synthesis of some of the few terpenes which have been prepared by synthetic methods.

Dr. T. P. Hilditch has arranged the Catalysis Section. The outstanding features which will appeal to the ordinary visitor are the scale model plant for the oxidation of ammonia (by the United Alkali Co., Ltd.), which is extraordinarily well done, and the various types of hardened oils which are displayed in moulded blocks (J. Crosfield and Sons, Ltd.). Visitors with any knowledge of chemistry will, in addition, be interested in the full-size converter unit of the United Alkali Co.'s process for oxidising ammonia to nitric acid, and in the various catalytic processes which serve for the interconversion of alcohol, acetaldehyde, acetic acid, and their related derivatives.

In the photographic section, arranged by Dr. T. Slater Price, the British Photographic Research Association are showing exhibits illustrating the action of light on the photographic plate, and a number of individuals are showing various exhibits connected with colour photography, photomicrography, sensitisers, etc.

Alkaloids

Dr. T. A. Henry and Professor F. L. Pyman have arranged the section on the Constitution and Synthesis of Alkaloids in groups according to the constitution of the principal classes of alkaloids. It is fully representative of the important work done in Great Britain on this subject during the last thirty years. In the tropane group a selection of the synthetic tropeines prepared by Jowett and Pyman is shown, while in the isoquinoline group, which has attracted much attention from British chemists, the work of Dobbie and Lauder on corydaline, that of Perkin on berberin and crytopine, and of Pyman on neooxyberberine and the methyl-canadines is illustrated by an extensive serious of specimens and diagrams. Of special importance are the exhibits shown by Berkin and Plant and Clemo and Perkin on synthetic work on tetrahydroquinoline and tetrahydrocarbazole derivatives and finally the progress so far achieved in the direction of the synthesis of the important alkaloid strychnine.

In the glyoxaline group the jaborandi alkaloids, pilocarpine, isopilocarpine and their allies and the degradation products obtained by Jowett and Pyman in the course of their work in these bases, are the most important features of a very complete series of specimens. There are also exhibits of many alkaloids whose constitution is undetermined or only partly determined, such as physostigmine or eserine, the aconite alkaloids, the alkaloids of ipecacuanha, and the interesting alkaloidyohimbine or quebrachine.

The Royal Opening

The following particulars have been issued regarding the opening ceremony on Wednesday next. Their Majesties will drive by motor-car from Windsor to Wembley, whence the Royal party will drive in State carriages to the Exhibition grounds. The opening ceremony in the Stadium will begin at 10.30 with music by the massed bands of the Brigade of Guards and the special choir of 1,500 voices, which will be conducted by Sir Edward Elgar. The Prince of Wales is due to arrive at 11.20. The National Anthem will be played as he enters the Stadium and drives round the arena to take up his position on the dais. At 11.29 a fanfare of trumpets by trumpeters of the Household Cavalry will herald the arrival of the King and Queen, who will enter the Stadium at 11.30. Their Majesties will be received with the National Anthem and the Royal salute by the guards of honour.

At 11.35 the Prince of Wales, as President of the Exhibition, will deliver his address to the King, and at 11.40 His Majesty will make his reply. Prayer will be offered by the Bishop of London at 11.44, and immediately afterwards the choir will sing a special piece of music, entitled "Jerusalem."

The King will then formally declare the Exhibition open. There will follow marching and counter-marching by the troops on the Stadium ground and certain presentations will be made to His Majesty. The Union Jack on the dais and all the flags of the Dominions and Colonies will be broken simultaneously. The ceremony will end at 12.15 when massed bands will play the National Anthem as the Royal party drives away.

Investigation into the Causes of the Oppau Explosion

Inconclusive Results of Official Investigations

At a meeting of the Faraday Society, held at Burlington House, London, on Monday, a number of communications were made relating to the Government investigation as to the cause of the ammonium nitrate-sulphate explosion at Oppau, Germany, in 1921. There were two reports presented. The first, by Sir Robert Robertson, F.R.S., the Government chemist, with an introduction by Sir Richard Threlfall, F.R.S., dealt with the chemical and physical properties of the substance, with appendices by Messrs. H. H. Thomas and A. F. Hallimond, and Sir William Bragg, F.R.S. The second report, by Dr. Rotter, Director of Explosive Research at the Research Department, Woolwich, dealt with an investigation carried out to determine whether the ammonium sulphate-nitrate prepared at Oppau possesses explosive properties.

Introduction

Sir Richard Threlfall, F.R.S., in the introduction to Sir Robert Robertson's report, states that the explosion at the Oppau factory of the Badische Anilin und Soda Fabrik on September 21, 1921, occurred on the site of a large store containing 4,500 tons of the double salt ammonium sulphate-nitrate, which was the chief manufacturing product of the factory. The stored salt had set to a rock-like mass, and at the time of the explosion was usually broken up by the use of common blasting explosives. In the course of an inquiry into the possible causes of the explosion, the Chemistry Research Board of the Department of Scientific and Industrial Research, found it necessary to have certain special investigations carried out in this country on the nature and stability of the double salt. About a ton of the salt was obtained from Germany and investigated very carefully at the Research Department, Woolwich, and at the Government Laboratory. The results of these investigations are of general interest, and the Board have thought it advisable to make them public. Sir Robert Robertson's investigation of the physical condition and the chemical composition of the double salt disclosed no circumstances which afforded a possible clue of the cause of the explosion. In particular, no evidence could be found in favour of suggestions which have appeared in the technical press, that the presence of certain impurities rendered the salt sufficiently unstable to be explosive. In the experiments carried out at Woolwich under the direction of Dr. Rotter, it was found impossible to detonate the salt, even under the most powerful compression and by the use of the most powerful initiators.

The Board, after careful consideration of these results and of information obtained from other sources, finally came to the conclusion that it was impossible on scientific grounds to arrive definitely at the cause of the explosion. They had to choose between three improbabilities—namely :—

1. That in spite of the negative character of the Woolwich results, and of previous experiments carried out in Germany, the double salt was capable at least of partial detonation under the extreme conditions of confinement in the store.
2. That through some oversight or accident there existed in the store large pockets of ammonium nitrate either unmixed with ammonium sulphate or mixed with a proportion insufficient to prevent detonation.
3. That a quantity of 50 to 100 tons of high explosive was concealed deliberately under the store, and that it was the explosion of this material which led to the disaster.

Of these three improbabilities, the Board considered that (2) was the least extreme, and they reported in this sense.

After they had reported, the report of the official German committee of inquiry was published. It is of interest to note that the conclusions of this committee agreed very closely with those of the Board. One circumstance of material importance unknown to the Board is disclosed in this report. It is stated that for some time previous to the explosion the practice of mixing the ammonium sulphate and nitrate in (saturated) solution before drying had been replaced by the practice of squirting ammonium nitrate on to a conveyor band and adding solid ammonium sulphate by hand. If this is true, it certainly increases the possibility that large pockets of material containing too high a proportion of nitrate were present in the store. It is stated in the report that a mixture containing 70 per cent. ammonium nitrate is capable of detonation.

The chief interest in the inquiry, so far as this country is concerned, is as to the safety or otherwise of the double salt if used as a fertiliser. On this point the Woolwich experiments must be regarded as decisive for anything like reasonable quantities ; but it must be presumed that neither in Germany nor elsewhere will blasting again be resorted to as a means of breaking up solid masses of the material.

Summary of Chemical and Physical Properties

The report read by Sir Robert Robertson shows that the Oppau salt consists roughly of ammonium sulphate to ammonium nitrate in the molecular proportion of 1 : 2, but there is a slight excess of the sulphate. It is not far removed from $(NH_4)_2SO_4 . 2NH_4NO_3$, which allows of complete combustion of the hydrogen by the oxygen, but although this is the case, its explosive properties would necessarily be less powerful than those of ammonium nitrate on account of the high heat of the formation of ammonium sulphate. Calculation gives 263 calories per gram of the mixed salt as compared with 383 for ammonium nitrate. The salt is fairly pure, and this agrees with the statement that it is produced from ammonium nitrate and ammonium sulphate made from gypsum and not from gasworks sulphate ; thus, there is no free acid, pyridine, or thiocyanate, characteristic of the last mentioned product. It contains a small proportion of water. Of substances likely to be explosive in themselves and so capable of acting as detonators, no hydrazine or nitrogen chloride was found to be present, nor were there found any bodies likely to decompose spontaneously, such as ammonium nitrite, nor any bodies of a readily oxidisable character. As the salt contains so little impurity it is unlikely that spontaneous heating would be produced owing to chemical change, nor were any such effects found when it was subjected to heating even under the accelerating effect of traces of acid.

The sample of ammonium sulphate was also fairly pure, and agreed with its stated production through gypsum.

The Oppau salt contained no free ammonium nitrate, but consisted entirely of some combination of the two constituents. This was clear from its density being lower than calculation from a simple mixture of the components would warrant, and it was established by the optical examination, which showed that the most of it at least was in the form of mixed crystals, while about one-third of it may be either in the form of mixed crystals or a double salt. It is of interest that this third consists of the mixed salt having the habit of the nitrate as regards its optical properties, experiments on crystallising the mixed salts having afforded two bodies of the 1 : 2 compositions, having the sulphate and nitrate habit respectively.

Experiments to determine whether there were any physical changes taking place on heating or cooling the salt did not lead to the discovery of any transition point. It does not look, therefore, as if the salt itself underwent physical changes on change of temperature. The presence of the small quantity of water, however, would appear to be important with regard to the propensity that the salt has of caking. This can be explained most readily by assuming that small crystals would form as the temperature fell from the small quantity of saturated solution associated with the salt and that these would act in the way of binding the salt together. In addition, however, it was found that isothermally the salt tended to bind together when it contained a small proportion of water, whereas the completely dry salt did not do so.

This conclusion is supported by the work * of Lowry and Hemmings, who studied the caking of several salts, including ammonium nitrate. They state that the caking of salts is generally dependent on the presence of a solvent, usually water, when the crystal faces are broken by pressure or grinding.

This investigation appears to show that there is nothing inherently suspicious about the Oppau salt through containing impurities which might set up chemical decomposition, or through possessing peculiar physical properties which might

* *J. Soc. Chem. Ind.*, 39, T. 101 (1920).

induce heat on undergoing some transformation. It is a substance, certainly not a mixture of its two components, but of the character of a mixed crystal, and so possibly with its oxygen and hydrogen somewhat better disposed, on account of their proximity, for combination, than they would be in a mixture of the constituent salts, in the event of such combination being induced by a sufficiently intense initiation.

Explosibility of the Salt

Dr. Godfrey Rotter, Director of Explosive Research, Research Department, Woolwich, presented a report on work described which was carried out at the request of the Department of Scientific and Industrial Research to determine whether the ammonium sulphate-nitrate stored at Oppau at the time of the explosion in 1921 possessed explosive properties.

For the purposes of the investigation 22 cwt. of the sulphate-nitrate, referred to hereinafter as "Oppau salt" was forwarded by the Allied Mission of Control, Berlin. The consignment was received on 5/10/22 and was used throughout for the experiments.

From theoretical considerations, it is clear that decomposition of Oppau salt can take place with evolution of heat, and it follows, therefore, that if this decomposition is initiated under conditions such that heat is not lost by the escape of heated products, the reaction will be propagated throughout a mass of the material. The generation of gases during such decomposition renders possible the production of explosive effects, the violence of which will depend on the velocity with which the decomposition is propagated through the bulk.

The heat of decomposition of Oppau salt calculated for the reaction which would give the highest possible value, is only 257 calories per gram.

This figure is low in comparison with the heat of explosion of most high explosives, but it is not lower than that of certain explosives, such as, for example, lead azide, which gave rise to violent explosive effects. While these considerations suggest that Oppau salt might possess explosive properties, the nature of its constituents, ammonium nitrate and ammonium sulphate, indicate that any such properties would not be of a pronounced character.

It has been stated that Professor Poppenberg has secured the detonation of Oppau salt, but attempts to confirm his results on the salt forwarded for test have not been successful, in spite of the fact that the conditions said to have been used in his experiments have been carefully reproduced. Numerous other experiments in which more powerful explosive impulses and better confinement were employed have failed to secure detonation of the salt.

Under conditions of heavy confinement which is continuously maintained, it has been possible to secure the propagation of a decomposition reaction in Oppau salt; this reaction, however, ceases as soon as any escape for the gaseous products is allowed. Even under these conditions, the most efficient possible method of decomposition does not appear to take place, and the disruptive effects produced are of a very mild character, resembling those to be expected from the slow generation of a pressure sufficient to burst open the surrounding container.

The investigations carried out comprised experiments on the sensitiveness to shock, chemical stability and explosive properties of Oppau salt, together with an examination of samples of the explosives, astralite and perastralite, obtained from Germany, and understood to be similar to the explosives used for breaking up the salt at the time of the explosion.

Examination of samples of astralite and perastralite forwarded from Germany shows that they appear to be very poorly mixed, and may thus be expected to vary very considerably in character from time to time. The samples examined were not particularly violent, but it is noteworthy that they were comparatively hot. As the mixtures contain aluminium and the mixing has been badly performed, it is conceivable that an extremely hot explosive may occasionally have been employed at Oppau.

Oppau Salt Cannot be Detonated

A large number of tests have been carried out under most diverse conditions, and it has been established that Oppau salt cannot be detonated, even though its temperature be raised to 155° C. (311° F.) and powerful confinement be afforded. It has been shown that a decomposition can be initiated in the salt by means of a charge of explosive or pyrogenic material, and that this decomposition can propagate throughout the bulk at a comparatively low speed. The reaction, however, continues only as long as the confinement is sufficient to retain the heated products in contact with the salt under considerable pressure, a comparatively small leak allowing the decomposition to die out. In the experiments in which this type of decomposition was investigated, the steel containers when ultimately burst open presented the appearance of having been ruptured by the application of a slowly increasing gas pressure rather than by the dynamic impulse of an explosive. This type of decomposition involves the ammonium nitrate only, the ammonium sulphate remaining chemically unchanged at the conclusion.

Presuming the silo at Oppau to have contained only the normal salt, it is clear that the explosion cannot have been a detonation set up by the explosive used. It is possible, however, that the large blasting charges which were being employed were placed so deep and were tamped so securely that they could not blow out, and under these conditions it is conceivable that the decomposition started by their explosion might proceed through a large quantity of salt. It is unlikely that such a reaction could spread very far before venting, and it is highly improbable that the effects produced at Oppau were due to Oppau salt alone.

The investigations recorded in this report were carried out by the staff of the Research Department at Woolwich.

Discussion on the Papers

Mr. W. Macnab said that the experiments carried out at Woolwich could not leave any doubt at all that the Oppau salt, if made of the composition stated, should not explode, and that the disastrous explosion that occurred could not possibly be due to the detonation of the salt. That did not clear up definitely, however, what had been the real cause of it.

Dr. F. A. Freeth said that ammonium sulphate was practically insoluble in strong ammonium nitrate solution. It had been stated in the paper that the Germans prepared their salt by throwing solid ammonium sulphate into a strong solution of ammonium nitrate. Therefore it was highly probably that they formed a mixture of ammonium nitrate and ammonium sulphate side by side and not a double salt.

Dr. R. E. Slade said it seemed an amazing thing that a chemical firm such as the Badische Company should have blasted these charges out. No doubt they had tried some experiments, but in this case there was a mixed salt, and one knew that ammonium nitrate was explosive, and it was difficult to understand why they had resorted to blasting.

Dr. J. N. Pring referred to the solubility relationship of ammonium sulphate and ammonium nitrate, and submitted that this relationship showed the possibility of segregation occurring through excess of water.

Mr. H. T. Tizard said that the Woolwich experiments were particularly valuable because the staff were not at all biassed in favour of the conclusion that the Oppau salt was almost impossible to detonate. In fact, they had had from Germany accounts which, to a non-expert, were fairly definite that the material could be made to detonate on a small scale, and also, there had been the apparently overwhelming success of a large scale experiment in Germany. At the same time, he himself felt that there was such a large scale effect in favour of the conclusion that it could be made to detonate that one could not be too certain that it would not. The biggest experiment, under the most extreme conditions at Woolwich, was one in which 250 lbs. of the material was employed, but in the experiment at Oppau the amount employed was about 5,000 tons, so that there was a scale effect of 50,000 times, and he did not think one could be certain that, with a scale 50,000 times as large as in the case of the Woolwich experiments, one could not get an explosion once in 100,000 times. The Badische Company was one of the finest chemical firms in the world, and they knew as well as anyone else the explosive properties of ammonium nitrate. They had tried a number of explosive experiments themselves and were continually engaged in routine analyses to determine the proportions of the product, and he considered it just a little too much to believe that these routine analyses in such a firm were carried out carelessly. In all probability they were most carefully carried out.

Dr. E. E. Walker, speaking of the scale on which these

experiments were carried out, asked if it would not be possible that detonation was more easily propagated on a large scale than on a small scale under certain circumstances? Sir Robert Robertson, replying to this point, said that probably it did not vary after a certain rather small diameter of tube was exceeded.

Dr. Rotter, referring to Mr. Tizard's remarks, said that obviously the experiments at Woolwich were not on such a grand scale as the German one, but, on the other hand, they were rather more drastic.

Dr. R. Lessing pointed out that a second explosion took place four seconds after the first, and also asked whether the salt received from Germany was fresh salt, or was collected after the explosion.

Sir Robert Robertson said it was taken from a neighbouring silo.

Dr. Lessing said that one silo was unexploded, and he believed that the German report stated that that had 60 per cent. of ammonium nitrate in it. The Report rather attributed that to atmospheric influences—rain and so on—as the result of which the nitrate had actually been concentrated. The German report on the disaster seemed to indicate that they were rather afraid of keeping the salt in a loose condition, as, in that condition, it would have a somewhat high explosibility. But it was questionable whether the risk involved in keeping the material in that state was greater than that entailed in the method of breaking up the rock salt which was formed by the presence of the small quantities of moisture, and to those engaged in manufacturing salts of this nature in this country it might be a question of deciding whether, after all, the loose condition would not be the safer.

Sir Frederick Nathan, after proposing a vote of thanks to Sir Robert Robertson and Dr. Rotter for the papers, said he had a great deal of sympathy with Mr. Tizard's remarks. Negative experiments were dangerous things from which to draw conclusions, and although the Germans carried out something like 20,000 blasting operations with this mixture without an accident, and although Dr. Rotter had carried out some experiments which were more drastic, in a way, than those carried out in Germany, he did not think it was right to assume definitely that there was not an explosion of any sort. The possibility of the existence of pockets of ammonium nitrate had occurred to him when he had read the particulars; the Chemistry Research Board thought that that was the least improbable, and the Germans had come to the same conclusion. Whatever the cause of the explosion, however, he agreed that it was almost unthinkable that a firm such as the Badische Company should have attempted blasting operations on a material, part of which was known to be an explosive. But they had done so, and it could not be too widely known that this material, if submitted to such treatment, might cause another accident. It should be widely known, so that nobody in this country should ever conceive the idea of using explosives to disintegrate their fertiliser,

The Chemical Theory of Colour Production

Professor Jocelyn Thorpe at the Royal Institution

Dr. Jocelyn Thorpe gave a Friday Evening Discourse on "Colours, Stains and Dyes" at the Royal Institute on April 11. He said that the great majority of chemical substances which are found in nature or can be prepared synthetically in the laboratory are colourless. Although a substance might be colourless to the human eye, it might actually be intensely coloured because it would give definite selective absorption in the ultra violet region. Such a substance was the hydrocarbon benzene, a hydrocarbon on which the coal tar dye industry depends. A demonstration was given of physical means of producing colour as well as chemical means.

Nature, as a matter of fact, it was pointed out, had adopted both processes for bringing about the colour in the many things we saw about us. At the same time, nature had done what man had not been able to do., viz., she had avoided the coal tar colours or the carbon colour compounds as far as she possibly could. It was only in one or two instances that we find, in nature, the colouring matters which we use for colouring our garments. By what might be called physical methods, nature had produced a most wonderful variety of different colours. The peacock's feather, for instance, was entirely illusory so far as colour was concerned. There was no real colour in it, and the colour present to the eye was entirely brought about by the interference of light by the fine hairs. The same thing applied to a very large number of substances, and he thought he was right in saying it applied to the majority of coloured feathers. In the case of coloured beetles, where there were no hairs, the colour interference was brought about by the fine pattern or fine indentations on the surface of the beetle. There were cases, however, in which some colouring matter was present, and Dr. Jocelyn Thorpe exhibited a small specimen lent him by Mr. Chaston Chapman of the colouring substance extracted from the blue wing of a parrot, which was actually a chemical substance. This particular substance depended for its colour on the presence of copper, as it contained 5·8 per cent. of copper.

As he had said, nature has avoided to a very great extent the use of carbon compounds in colouring her natural bodies. The reason for that was that there are as many as 300,000 compounds of carbon known to the organic chemist, or some of them (laughter), and at least 4,000 were added to them annually by the research workers. The big majority of carbon compounds were colourless in the sense that they gave some general absorption throughout the visible region of the spectrum but they did not give selective absorption. Others, however, were definitely and strongly coloured, and wherever that colour occurred it was always due to the condition which to the organic chemist was known as unsaturation. The unsaturated carbon was definitely less stable than the saturated carbon.

Absorption Colours

Actually the number of substances which were used or which go to form the great class of organic colouring matters, were based entirely on benzene or some substance derived from benzene. Dr. Thorpe said he used the word "benzene" in the widest sense as being the parent of all the other hydrocarbons, naphthalene, anthracene and so forth. It seemed fairly reasonable to suppose that if we were dealing with a potential colouring substance such as benzene, which was so intensely coloured that it was colourless—as he preferred to look at it—then it ought to be possible by suitable reactions to so far bring about whatever the molecular conditions may be—and of these we were not certain—as to produce from these colourless substances coloured substances. It was shown diagramatically how it was possible to bring about a change of the hydrocarbon benzene into a condition which gave rise to a visibly coloured substance, quinone.

It was many years ago since Armstrong suggested that the quinone structure was the basis of coal tar colours, but it was now accepted as the basis of the chemistry on which the coal tar colours were built, although it was not so accepted at first. It was obvious that there was another difficulty to face if this were the right intepretation of the production of colour in these carbon compounds, because there was not only the condition of unsaturation to deal with—the inherent instability of colour due to the fact that the colour substance must be unsaturated—but there was the condition of affairs that one is dealing with a substance which had a large ultra violet absorption, and therefore colourless, but thrown back. Therefore, you are dealing with a substance which is in a state of wobble. It was, as a matter of fact, chemically a simple business to throw the absorption back into the visible region of the spectrum.

In this way, continued the lecturer, it was a simple matter, by suitable methods, to throw the absorption right back into the blue or the red anp produce coloured substances, or, on the contrary, it could be thrown back into the ultra violet. In other words, by suitable but slight changes, one could throw the absorption into any part of the visible spectrum desired. That was a very considerable advantage from the

point of view of the colour maker, because all he had to do was to start with some definite solution, and merely by slight alterations he could produce practically any colour he liked all through the spectrum.

The Search for Dyes

The lecturer then referred to the work of the late Dr. Perkin in the discovery of the coal tar dyes, and shortly after the discovery of coal tar dyes chemists naturally turned their attention towards discovering the nature of the two typical dyes, alizarine and indigo, which were the two chief substances in common use and of very considerable commercial importance. The object of chemists in those days was not so much to prepare colours synthetically, but rather to ascertain what particular structure led to the possession of those valuable properties of vat and mordant dyes, because once having discovered what that particular structure was, it should then be a simple matter to prepare in the laboratory, and ultimately in the works, compounds possessing other colours. The discovery of alizarine from the basis of anthracene shewed at once that it could be prepared from a substance present in coal in sufficiently large quantities to meet the world's demand, and that had now actually happened. It took Baeyer actually 18 years to determine the structure of indigo, but once the structure was determined the same results followed, and the actual preparation of synthetic indigo led to the preparation of a large number of other colours, differing in shade, but all based upon the same structure, and all yielding to the same process of vat dyeing.

Position of the British Dye Industry

Finally, at the beginning of the century, entirely by accident, a dye was discovered in Germany—indanthrene blue—which proved to be the parent substance of the fastest and most important series of dyes which we know. The structure of indanthrene was extremely complex, but it represented one of those very stable carbon complexes which was built up of a large number of benzene rings, the stability of which increased by increasing the number. In indanthrene there were no fewer than eight benzene nuclei bound together, and the stability was such that indanthrene would withstand high temperatures, much higher than those at which an organic substance remains unchanged. Actually before the war we relied upon Germany for the production of our dyestuffs, and, what was still more serious, we left to them the research upon which the production of new dyestuffs depended. Dyestuff chemistry was merely a branch of organic chemistry, which latter included also the preparation of many other organic substances which were useful in a variety of industries. The possession of a dyestuff industry, however, implied the possession of a band of organic chemists in our university and university college laboratories where organic chemists could be trained adequately in methods of research. As a member of the Dyestuffs Commission, it had been his pleasant duty during the past six months to visit practically all the dye-producing works in this country, and as he knew the condition of the industry before the war, he was very agreeably surprised to find the tremendous progress that had been made. If we had merely reached the level of excellence which the Germans had attained prior to the war, the fact would have been creditable, but we had done more, and in several cases, notably in the production of a particular jade green, we had drawn ahead, a position which he did not think we should soon lose.

Third Census of Production

In accordance with Section 9 (1) of the Census of Production Act, 1906, the President of the Board of Trade has appointed the following gentlemen, together with officials of the Home Office and the Board of Trade, to be a Committee for the purpose of advising the Board as to the preparation of the forms and instructions necessary for the taking of the census and the making of any rules under that Act: Mr. T. J. Arnold, J.P., Sir Arthur Balfour, K.B.E., Sir Hugh Bell, Bart., C.B., Professor A. L. Bowley, Mr. Stephen Easten, O.B.E., J.P., Sir Henry J. Gibson, K.C.B., Mr. Kenneth Lee, Professor D. H. MacGregor, Mr. R. G. Perry, C.B.E., Sir W. Peter Rylands, Mr. Arthur Shaw. The Committee will hold its first meeting at an early date. The Secretary of the Committee is Mr. G. A. G. Stanley, Board of Trade, Great George Street, London, S.W.1, to whom all communications should be addressed.

Society of Dyers and Colourists

Manchester Section

The annual meeting of the Manchester Section of the Society of Dyers and Colourists was held on Friday, April 11, when Mr. William Marshall presided.

The hon. secretary (Mr. L. Thompson) presented his report for the session, stating that the membership was now 407 as compared with 420 last year, being 282 members, 59 associates, and 66 junior members, the comparative numbers for the previous year being 293 members and 135 junior members. There were five vacancies on the committee with six nominations, a ballot, therefore, being necessary, Messrs. Price and Burr were appointed scrutineers, and, when the papers were collected, it was found that there was a tie between two of the nominees. A second ballot was then taken, and the following were declared elected: Messrs. Alfred Edge, S. H. Higgins, William Marshall, W. H. Pennington and L. Thompson. This concluded the business of the annual meeting.

At the ordinary monthly meeting which followed, a paper on "The Identification of Insoluble Azo Colours on the Fibre, and of Azo Pigments in Substance," by Dr. F. M. Rowe, and Miss C. Levin, M.Sc.Tech., was presented.

Dr. Rowe described the methods available for use in the identification of azo compounds by reduction with acid stannous chloride, hydrosulphite in neutral or alkaline solution, etc., or by oxidation with fuming nitric acid, etc. Many azo pigment colours were derived from diazotised amino-compounds containing nitro groups, and in such cases treatment with fuming nitric acid afforded the most convenient means for the identification of this portion of the molecule, particularly when only a small quantity of the product was available. This led to the formation of a diazonium nitrate, but it was not clear from the literature whether this reaction was ever accompanied by the introduction of nitro groups into this residue, and if so in what cases. A series of azo derivatives of *b*-naphthol, therefore, was submitted to this reaction. When the diazotised amine used in the preparation of the azo compound did not contain a nitro group, in all cases a nitro derivative of the diazonium nitrate was obtained. This nitro group usually entered the *p*-position with respect to the diazonium group when free, or entered the *o*-position when the *p*-position was already occupied. When a nitro group was present in the *m*- or *p*-position, the unaltered diazonium nitrate was obtained, but when only a nitro group was present in the *o*-position, a second nitro group was introduced in the *m*-position with respect to the first. Consequently, it was necessary to take these results into consideration when using this method for the examination of an aryl-azo-*b*-naphthol.

The diazonium compounds were identified by coupling one-half with *b*-naphthol and one-half with *b*-hydroxynaphtholic acid anilide, crystallising the products and determining their melting points. Owing to the ease with which such compounds were prepared in a pure condition and the wide variation in melting points, this method was recommended for the identification of primary aromatic amines when only a small quantity was available. For this purpose, a table of melting points had been compiled comprising about 150 azo compounds derived from a variety of diazotised amines coupled with *b*-naphthol and various arylides of *b*-hydroxynaphtholic acid.

In view of the growing importance of insoluble azo colours on cotton, the extension of the number of bases and the variety of so-called naphthols now on the market, a method had also been devised for the absolute identification of such compounds on the fibre by means of this table of melting points. A pattern of the coloured calico about two inches square was washed with dilute ammonia and soap, dried and dissolved in diluted sulphuric acid (80 cc. acid and 20 cc. water) at 10° C. The clear solution was poured on to ice, the precipitated colouring matter filtered, crystallised, and its melting point determined.

Finally the means used for the determination of the constitution of Griesheim-Elektron's Naphthol AS-BO, Naphthol AS-BS, Naphthol AS-G, Naphthol AS-RL, Naphthol AS-SW, Fast Black LB base, Fast Red RL base, Fast Yellow G base and eight members of the series of Rapid Fast Printing Colours, were described.

Chemical Trade Returns for March

Imports Increased: Exports Maintained

ALTHOUGH, as announced last week, manufactured goods as a whole showed decreased overseas trade during March, the imports of chemicals, dyes, drugs and colours have increased in value to £1,629,954 against £1,579,376 in March, 1924, and £1,221,583 against February last. Exports were valued at £2,352,315, an increase over March, last year, of £121,744, but a decrease on the February figures of £318,559.

The detailed figures as to quantities given below indicate that the most marked changes are the decreased importation of sodium nitrate, the increase in the exports of sulphate of ammonia, benzol and toluol, naphtha and carbolic acid. The exports of coal tar dyestuffs show a decrease for the first time for many months.

Imports for March

INCREASES.

		1924.	1923.
Acid, acetic	tons	744	611
Acid, tartaric	cwt.	2,428	1,791
Bleaching materials	,,	4,233	2,911
Calcium carbide	,,	67,848	66,592
Glycerin, crude	,,	4,500	612
Nickel oxide	,,	8,759	2,833
Potassium compounds, except nitrate	,,	490,913	433,354
Sodium compounds, except nitrate	,,	26,490	15,413
Zinc oxide	tons	551	490
White lead	cwt.	10,965	10,185
Unspecified painters' colours	,,	129,099	68,550
Essential oils, except turpentine	lb.	342,385	339,497

DECREASES.

		1924.	1923.
Distilled glycerin	cwt.	326	373
Potassium nitrate	,,	4,478	5,559
Sodium nitrate	,,	108,273	231,902
Cream of tartar	,,	4,262	4,634
Intermediate coal tar products, including aniline oil and salt, and phenyl glycine	cwt.	—	414
Alizarine dyestuffs	,,	977	3,718
Synthetic indigo	,,	—	474
Unspecified coal tar dyestuffs	,,	2,409	2,750
Natural indigo	,,	94	137
Barytes, including blanc fixe	,,	52,506	98,796
Turpentine	,,	17,085	18,184
Mercury	lb.	67,724	404,932

Exports for March

INCREASES.

		1924.	1923.
Acid, sulphuric	cwt.	3,012	1,653
Ammonium sulphate	tons	26,321	18,343
Anthracene	cwt.	400	—
Benzol and toluol	galls.	13,246	597
Carbolic acid	cwt.	12,990	9,095
Naphtha	galls.	4,638	2,660
Copper sulphate	cwt.	7,261	6,076
Distilled glycerine	,,	13,193	7,481
Potassium chromate and bichromate	,,	3,357	1,659
Unspecified potassium compounds	,,	5,705	999
Caustic soda	,,	131,846	121,019
Sodium chromate and bichromate	,,	4,661	3,846
Zinc oxide	tons	197	146
Dyestuffs, except from coal tar	cwt.	6,236	4,627
Painters' colours, etc., prepared	,,	25,131	22,108

DECREASES.

		1924.	1923.
Acid, tartaric	cwt.	1,138	1,206
Ammonium chloride	tons	313	379
Bleaching powder	cwt.	20,067	33,229
Naphthalene	,,	5,624	15,249
Tar oil, creosote, etc.	galls.	2,234,298	2,655,226
Unspecified coal tar products	cwt.	23,071	25,482
Crude glycerin	,,	1,466	4,985
Potassium nitrate	,,	1,394	1,869
Sodium carbonate, etc.	,,	411,523	482,567
Sodium sulphate, including saltcake	,,	41,794	53,074
Unspecified sodium compounds	,,	48,020	53,355
Coal tar dyestuffs	,,	7,474	7,522
Barytes, including blanc fixe	,,	826	1,484
White lead	,,	12,901	16,485
Paints and colours ground in oil or water	,,	25,131	22,108
Painters' colours, etc., unspecified	,,	43,765	47,616

Chemical Matters in Parliament

German Reparation (Recovery) Act

Mr. Greene (House of Commons, April 10) asked the Chancellor of the Exchequer whether he was aware that, owing to the reduction of the reparation levy on German imports, certain British industries had already been adversely affected; that, owing to this reduction, the Royal Worcester Porcelain Company would have to close down their department which was the chief manufacturer in Great Britain of porcelain chemical vessels, and that Germany will have practically a monopoly of the trade in the said vessels in this country; and whether he would consider the re-imposition of the full amount of the levy in the interests of British manufacturers and workmen?

The Parliamentary Secretary to the Board of Trade (Mr. A. V. Alexander): I have been asked to reply. I am, of course, aware that during the period in which the German Government failed to repay the export levy, the levy operated as a protective duty, a purpose which it was never intended to fulfil. This element of Protection has now been removed. I have no information as regards the second part of the question. The reply to the third part of the question is in the negative.

Mr. Mosley asked the Chancellor of the Exchequer, in view of the fact that the existing arrangements with regard to the Reparation (Recovery) Act expire on April 15, whether they would be continued beyond that date?

Mr. Snowden: H.M. Government have agreed with the German Government to extend the existing arrangements for two months, namely, to June 15. The penal provisions of the German Ordinance of March 3 will be similarly extended.

Experimental Lactose Factory

Mr. Buxton, Minister of Agriculture (House of Commons, April 11), replying to Sir J. Leigh, said that the Experimental Lactose Factory is at Haslington, near Crewe, and has been in existence since 1920, during which time investigations into the manufacture of lactose from cheese whey have been carried on. The factory is the property of the Ministry of Agriculture, and has so far been controlled directly from my Department. It is proposed that experiments should be continued throughout the coming whey season, at an estimated cost of £5,000.

British Dyestuffs Corporation

Mr. Sandeman (House of Commons, April 14) asked the President of the Board of Trade what steps the Government propose to take in view of the statement made by Brigadier-General Sir William Alexander, at the annual meeting of the British Dyestuffs Corporation, to the effect that the final decision as to the policy of the British Dyestuffs Corporation in regard to arrangements between them and the Interessen Gemeinschaft lay with the Government?

Mr. Alexander: The matter is under consideration, and I am not at present in a position to make a statement.

Fuel Research Board

Mr. Trevelyan, President of the Board of Education (House of Commons, April 14), replying to a question by Sir H. Brittain, said that the Fuel Research Board was established in February, 1917, and that the expenditure by the Department of Scientific and Industrial Research on the work of the Fuel Research Board up to March 31, 1924, amounted to £195,480. The premises of the Fuel Research Station at East Greenwich were provided, and are maintained, by H.M. Office of Works; the expenditure by that Department on the station up to March 31, 1923, amounted to £203,352. The numbers and emoluments of the staff employed under the Board are given in the Estimates for the Civil Service for the current financial year (Class IV, 9, pages 67 and 68).

Wireless Talk by Sir William Alexander

SIR WILLIAM ALEXANDER, M.P. recently gave a talk from the Glasgow Station of the British Broadcasting Company on "The Scot in London." In the course of his talk, which was published in the *Radio Times* of April 11, Sir William said that when Scotland sends her politicians to London they have a way of becoming Prime Ministers. When her sons hear the imperative call of the Highlands, London provides her speediest trains to take them home again.

From Week to Week

Sir Alfred and Lady Mond arrived in London on Saturday, April 12, on their return from a holiday in India.

Dr. William Cullen (a director of Allen, Craig and Co.) has been elected to the Council of the Institution of Mining and Metallurgy.

The Anglo-German agreement reducing the export levy from 26 to 5 per cent. has been prolonged until June 15, pending a definite settlement of the reparations problem.

Mr. A. R. Tankard, public analyst to the City of Hull, at the invitation of the Food Preservatives Committee, has given evidence before that body on the question of food preservation.

The Acme Chemical Co., of Vale Road, East, Tonbridge, gave a supper to about forty members of the staff and employees, on Saturday, April 12. The occasion was the appointment of Mr. George Hawes as works manager.

An accident causing the death of two men and serious injuries to a third occurred at the Midland Tar Distillery Company's works at Oldbury on Monday. It is believed that one of the men was overcome by fumes from the still and that the other two were overpowered in an attempt to rescue him.

The number of persons on April 7, 1924, recorded on the registers of Employment Exchanges in Great Britain was 1,044,700. This was 14,073 less than on March 31, 1924, and 241,423 less than the figures recorded on December 31, 1923. The total includes 775,200 men, 31,500 boys, 205,500 women, and 32,000 girls.

Mr. W. A. Williams, F.I.C., F.R.S.E., lecturing to the members of the Royal Scottish Society of Arts in Edinburgh on Monday, gave an interesting review of "The Rubber Industry in Edinburgh." In the course of his lecture Mr. Williams described the discovery of the vulcanisation process, the first rubber factory in Scotland, and the uses of rubber in the war.

Among the latest additions to the exhibits at the National Portrait Gallery are the following bequests under the will of the late Dr. Muspratt, of Liverpool: James Sheridan Knowles, 1784–1862, dramatist and actor; author of "The Hunchback," painted in 1849 by William Trautschold. Henry Peter, Baron Brougham and Vaux, 1778–1868; Lord Chancellor, marble bust, 1867, by John Adams-Acton.

Mr. G. C. Usher, general manager and director of Vickers and International Combustion Engineering, Ltd., has sailed for U.S.A. to consult with the directors of the International Combustion Engineering Corporation of New York City. He will also make a tour of inspection of the more recent electric power stations which the Company has equipped with Lopulco pulverised fuel plant. He expects to return in about six weeks.

The Ministry of Agriculture announces that Oxford University has accepted its proposal to set up a separate research institute in agricultural engineering. The University has chosen as director of the new institute Captain B. J. Owen, who for some time past has taken an important part in connexion with the Ministry's machinery research. The Ministry propose that tests of agricultural machinery shall be carried out and certificates issued on its authority, but that the actual work of testing shall be conducted by the new Oxford institute, the National Physical Laboratory, and other institutions.

The Catalytic Chemical Co. were summoned at Brentford police court on Thursday, April 10, for not abating a public nuisance. The case, which was based on a petition by two residents, arose out of the manufacture of butyric acid, which was alleged to cause disagreeable smells up to 300 yards distance from the works. The defence admitted the emission of fumes, but submitted that the process used was up to date and controlled, and the firm had done all they could to get rid of the smell. An adjournment for six months was ordered to give time for the company to conduct further experiments on the prevention of the nuisance.

In the King's Bench Division on Monday, Mr. Justice Lush heard an action brought by James Arthur Brooks, trading as Brooks and Co., dyeware manufacturers, of Flash Print Works, Huddersfield, against Reginald E. Smith, commercial agent, of Eastbourne, claiming an amount for goods sold and delivered. Defendant disputed the accuracy of the account in respect of the goods, and eventually the amount was agreed in court at £125. The action then proceeded with the defendant's counter-claim, asking for a declaration that he was the sole agent in the South of England for the sale of plaintiff's goods. Eventually judgment was entered for plaintiff on both claim and counter-claim for an agreed sum with costs.

The annual conference of the National Drug and Chemical Union was held in London on Sunday, April 13. A resolution was carried expressing the opinion that the interests of the community would best be served by the complete nationalisation of the medical services, and that until such a national medical service is in existence all retail and dispensing establishments contracting under the National Health Insurance Acts for the supply of medicines, drugs, and surgical sundries should be obliged by the Ministry of Health to observe payment of trade union wages and conditions. Another resolution passed at the conference called for State inspection of all dispensaries, with a view to securing accuracy and cleanliness in the preparation of all drugs and medicines.

Sir Ernest Rutherford delivered a discourse at the Royal Institution on Friday, April 4, on "The Nucleus of the Atom." Among other matters an account was given of some experiments made with Dr. Chadwick, in which certain elements had been disintegrated by a very intense bombardment by swift alpha particles. In the case of the elements boron, nitrogen, fluorine, sodium, aluminium, and phosphorus, a hydrogen nucleus or proton was liberated at high speed and its presence could be detected by the scintillations method. A new method had recently been devised by which it was possible to detect the liberation of hydrogen nuclei of much lower speed, and it had been found that, in addition to the elements mentioned, neon, magnesium, silicon, chlorine, argon, and potassium were disintegrated by alpha particles bombardment.

Sulphuric Acid Plants

To the Editor of The Chemical Age.

Sir,—Your anonymous correspondent "Ferrite" appears much more biassed in favour of mechanical burners than the writer is in the matter of hand burners. This is clearly evidenced by a perusal of the following, representing our respective views:

Both shelf burners of the hand-operated type and mechanical burners are employed for the combustion of spent oxide. Generally speaking, from the point of view of labour, there is little to choose between the two methods. The advantage of hand burners is the absence of dust.

Mechanical burners must of necessity create dust, and however efficient the dust arresting devices may be, experience has abundantly proved that there is nothing to eclipse hand-operated spent oxide burners. Of course, it is conceded that with mechanical burners a better burning efficiency is possible, but this represents only a small saving, and it is generally believed that the greater reliability of hand burners, with the production of burner gases practically free from dust, is an undoubted factor in their favour.

. . . Mr. Parrish would have one believe that the hand-charged kilns are far superior to mechanical burners. This point is certainly debatable. Labour, he says (speaking generally), is practically the same in both cases. Perhaps the author would like to make his case more clear with figures. Mechanical roasters are far beyond hand-charged kilns, even when one considers the extra cost of their running and upkeep.

After some years of experience with mechanical burners and hand-charged kilns, and taking everything into account, one must confess that mechanical roasters, such as the Harris furnace and the Herreshoff furnace, are far superior to any set of hand kilns yet built.

It will be appreciated that the writer's observations were alone confined to spent oxide burners. What is germane in the latter case is not necessarily applicable to sulphur, pyrites and zinc blende burners.

As your correspondent rightly points out, the subject is a debatable one. No doubt a suitable opportunity will occur shortly for a presentation of various views on this subject, when the undersigned will gladly submit his case.

As regards the final paragraph of your correspondent's letter, the information to which he refers can be obtained through the proper channel.—Yours, etc.,

April 11, 1924. P. Parrish.

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The theory of colloid phenomena. U. R. Evans and L. L. Bircumshaw. *Kolloid-Z.*, February, 1924, pp. 65–72.

SPECTROSCOPY.—The absorption spectra of coloured glasses. P. P. Fedotieff. *Z. anorg. u. allg. Chem.*, March 29, 1924, pp. 87–101.

CHARCOAL.—Active charcoal. Part II. Activity and the presence of foreign atoms. O. Ruff and E. Hohlfeld. *Kolloid-Z.*, March, 1924, pp. 135–139.

ANALYSIS.—The estimation of metals of the ammonium sulphide group by means of hydrogen sulphide under pressure. L. Moser and M. Behr. *Z. anorg. u. allg. Chem.*, March 29, 1924, pp. 49–74.

Electrometric titration of mercury with ammonium sulphocyanide. R. Müller and O. Benda. *Z. anorg. u. allg. Chem.*, March 29, 1924, pp. 102–104.

The estimation of sugar in sweet wines and particularly in Madeira. O. Klein. *Z. angew. Chem.*, April 3, 1924, pp. 191–195.

A new test for nitric acid and nitrates. H. Wolf and E. Heymann. *Z. angew. Chem.*, April 3, 1924, pp. 195–196.

ADSORPTION.—Adsorption as the first step of chemical combination, investigated by adsorption measurements of zirconia hydrogel. Part I. Arsenious and arsenic acid. E. Wedekind and H. Wilke. *Kolloid-Z.*, February, 1924, pp. 83–96.

Miscellaneous

REACTIONS.—Trimolecular gas reactions. Part I. The mechanism of the formation of acetic acid from aldehyde and oxygen. A. Kiss and L. Demény. *Rec. Trav. Chim. des Pays-Bas*, March 15, 1924, pp. 221–248.

The treatment of Mexican asphalt and paraffin wax by heating under pressure with sodium formate and with carbon monoxide and water respectively. H. I. Waterman and F. Kortlandt. *Rec. Trav. Chim. des Pays-Bas*, March 15, 1924, pp. 249–257.

Transformations caused by heating mixtures of brown coal and paraffin wax in the presence of hydrogen or carbon monoxide in closed vessels. H. I. Waterman and F. Kortlandt. *Rec. Trav. Chim. des Pays-Bas*, March 15, 1924, pp. 258–261.

AMINES.—Investigations relating to the production of amines catalytically. E. Briner, P. Ferrero and E. de Luserna. *Helv. Chim. Acta*, March 15, 1924, pp. 282–294.

Patent Literature

Abstracts of Complete Specifications

212,500. LIQUID HYDROCARBONS, ESPECIALLY CRACKED SPIRIT, TREATMENT OF. F. G. P. Remfry, Meadhurst, Cadbury Road, Sunbury-on-Thames. Application date, May 22, 1923.

Cracked spirit is treated in the liquid phase by passing it through a heated porous contact substance such as bauxite or Fuller's earth, floridin, activated charcoal, etc. The substance is maintained at about 100°–130° C., and the liquid is passed upwards through the material. The unsaturated compounds are polymerised, and the polymers are dissolved in the liquid and are withdrawn with it. Petroleum, petroleum distillates and other liquid hydrocarbons may also be treated by this process. In this case, the filtration through the heated contact substance is followed by filtration through a cold substance. The upward passage through the liquid ensures the free liberation of gases and prevents compacting of the substance, and the latter is thus effective for continuous use. In an example, cracked spirit with a boiling point of 200° C., and a sulphur content of 0·294 per cent. was passed through bauxite heated to 100° C. by a steam jacket, two pounds of bauxite being used per gallon of spirit. The filtrate was then distilled to a final boiling point of 175° C., yielding a colourless distillate having a sulphur content of 0·153 per cent. If only half the quantity of bauxite is used, the sulphur content rises to 0·173 per cent.

In the application of the treatment to kerosene containing 0·31 per cent. of sulphur, no improvement was effected by filtering through bauxite at 100° C., but when the filtrate was subsequently passed through cold bauxite, the sulphur content was reduced to 0·13–0·15 per cent. This result cannot be obtained by passing the kerosene through cold bauxite only.

212,598. CONCENTRATORS FOR ORES OR OTHER MATERIALS. G. C. E. Keet, Violet Road, Primrose, Germiston, Transvaal. Application dates, October 17, 1922, and March 2, 1923.

This concentrator is of the kind in which pulp is passed over a number of concentrating surfaces arranged in step-like formation. A series of trays 1 are mounted on rollers 2, which are

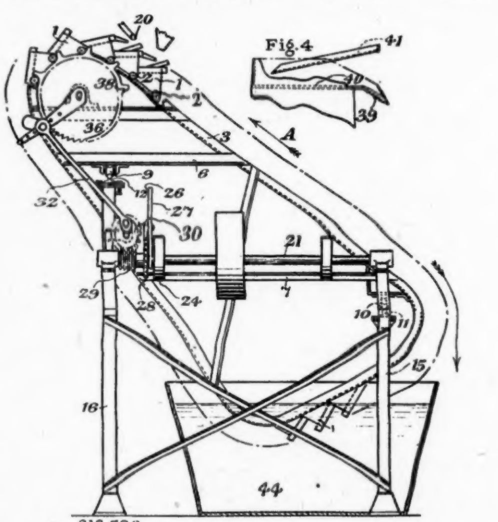

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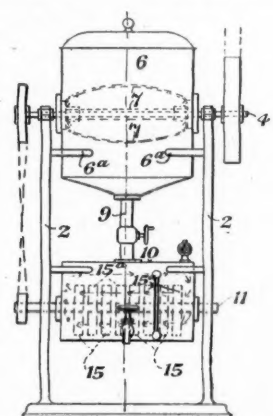
Fig. 1

carried in a framework 3. The cross-members 6, 7 of the frame are supported by means of rollers 9, 10, on rails 12, 11, so that the whole frame is capable of lateral movement. The rails 11, 12, are supported on columns 15, 16 in an adjustable manner, so that their height and consequently the inclination of the frame 3 may be varied. A rotating shaft 21 carries eccentrics 23, 24, the eccentric rods of which are connected to the framework 3 to give it a reciprocating lateral movement. The rotation of the shaft 21 also operates, through rods 26, 27, a ratchet wheel 28, which together with a worm 29 is freely mounted on the shaft 21. The worm 29 operates through a worm wheel 30 and rod 32, a ratchet wheel 36 carrying sprocket wheels 38. The latter therefore move the trays 1 intermittently along their track. Each tray is provided with a lip 39, and the usual concentrating surface 40. Each tray carries a deflecting plate 41, which receives pulp from the tray immediately above, and deposits it at the back of its own tray, so that the heavier particles are deposited on the concentrating surface. Water is supplied at 20 to the uppermost tray, and passes over the trays in succession to the lowermost tray. The trays ultimately enter the bath 44, where the concentrates are washed off and collected. The trays travel in the direction of the arrow A.

212,642. EMULSIFYING APPARATUS. A. Sonsthagen, Forest Lea, Highstone, Leytonstone, Essex, J. L. Wood, 109, St. Albans Road, Seven Kings, Essex; and Keenok Co., Ltd., 59, Fenchurch Street, London, E.C.3. Application date, December 14, 1922.

A closed vessel 6 is supported by horizontal arms 6a mounted on vertical supports 2. A shaft 4 passes horizontally through the vessel 6, and carries beating members 7. The vessel 6 opens at the bottom into a valve-controlled tube 9, which



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opens into a closed vessel 10, in which the emulsifying is effected. A horizontal shaft 11 passes through the vessel 10, and carries blades or vanes 15, 15a. The blades 15 exert a thrust on the material in one direction, and the blades 15a in the opposite direction. The pitch of the blades 15 is greater than the pitch of the blades 15a. The lower part of the vessel 10 closely surrounds the blades, but a space is left at the upper part of the vessel through which the material may pass from one end of the vessel to the other. The vessel 10 may be provided with a steam jacket. In an alternative form, the vessel 6 may be combined with the vessel 10.

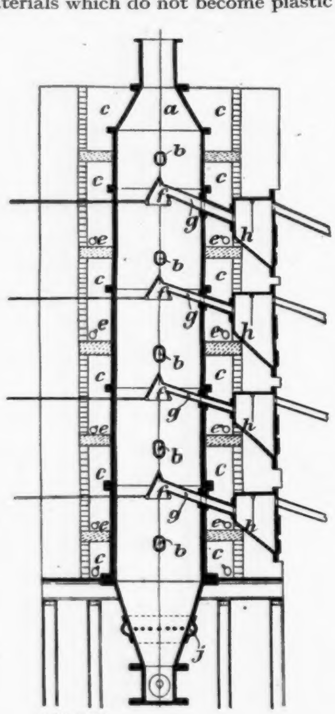
212,768. SULPHURIC ACID, PROCESSES AND APPARATUS FOR THE MANUFACTURE OF. Sulfur Akt.-Ges., 2, Thorgasse, Zurich, Switzerland, and W. Franck, 1, Wohlgelegen, Mannheim, Germany. Application date, April 13, 1923.

In the usual lead chamber process for the manufacture of sulphuric acid, the Gay-Lussac and Glover towers are usually filled with acid-proof materials such as coke or stoneware, but in this invention these towers are used without filling materials by spraying the acid into them in a state of fine sub-division. When pyrites containing dust is employed for producing sulphur dioxide, it is usually found that there is an accumulation of slime in the Glover tower, which necessitates periodical stoppages in the working of the tower for cleaning purposes. In some cases, the filling material is choked by the formation of sulphates of aluminium or iron in the tower, which necessitates clearing out and refilling. These accumulations in the tower also cause considerable loss of draught. These disadvantages are avoided by the present invention, by dispensing with the filling material, so that the tower consists

only of a lead casing with a stone lining. The velocity of the gases through such towers is low, so that adequate time is given for the necessary reactions to take place.

212,770. Fractional Distillation of Oils from Oil Shale or Similar Material, Apparatus for. D. K. Fairweather, Glasgow. From R. H. Crozier, Sofaer's Buildings, Phayre Street, Rangoon, Burma. Application date, April 18, 1923.

This apparatus is applicable for the treatment of oil shale and other materials which do not become plastic when heated



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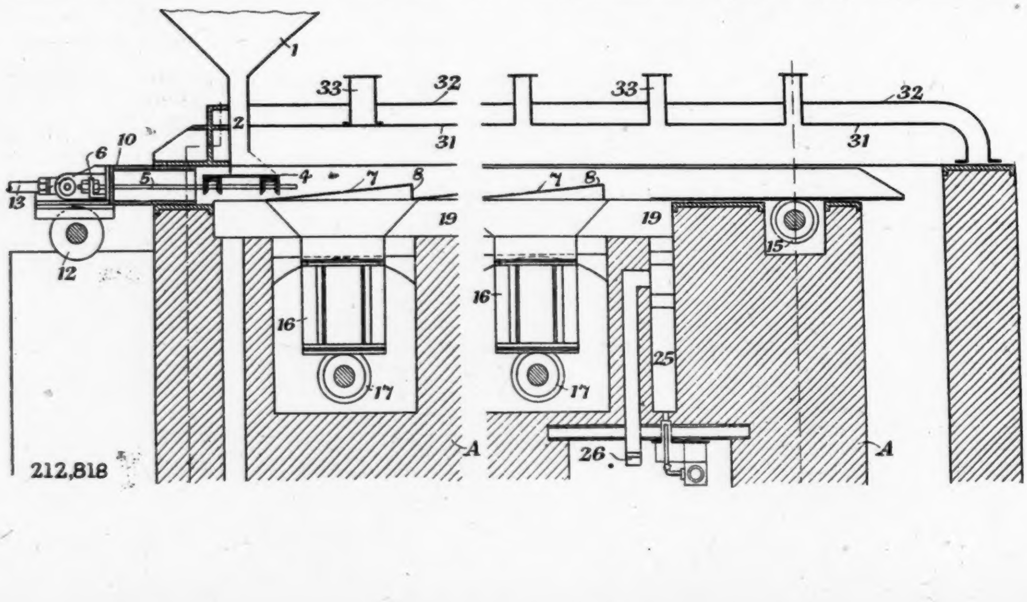
in a confined space, or which may be kept in continuous motion by mechanical means. In the usual method of distilling oil shale, torbanite, coal, etc., oils of a paraffin, naphthalene or asphaltic base are obtained, containing a quantity of cracked and unsaturated compounds, but in this apparatus the retort is divided in a series of distillation chambers from which the oil vapours are separately withdrawn.

A vertical cast-iron retort *a* is provided with a series of diagonal flues *b*, which are inclined to the horizontal. The retort is heated by combustion gases, which are conducted by means of surrounding flues *c* to various sections of the retort to be heated. The circulation of hot gases through the compartments *c* is controlled by dampers arranged in the partitions separating the compartments *c*, and the circulation through the internal flues *b* is controlled by dampers at their ends. The temperature of the sections of the retort may also be controlled by the use of gas burners *e*. Each section of the retort is provided with a vapour trap *f* having an exit pipe *g* leading to a dust trap *h*, and thence to any form of condensing apparatus. The pipes *g* are heat-insulated in the flues *c* to avoid superheating or cracking of the vapour. The number of such traps *f* and their positions correspond to the number of fractions to be recovered. The lower edge of each trap *f* is formed as a circular pipe, which is perforated to allow of steam being admitted into the retort in the form of a circular spray or screen. These steam screens prevent the mixing of vapours produced in any section of the retort with those produced in an adjacent section. Steam may also be injected into the bottom of the retort through perforations *j*.

212,818. Extracting Tars and Gases from Bitumen-containing Materials, Method of. M. Klötzer, Mosczinskystrasse, 19, Dresden—A, Germany. Application date, July 24, 1923.

The apparatus is for extracting tar and gas from coal, peat, shale, and the like, and the stages of drying and distillation are carried out in a single furnace chamber. The fuel is fed by a hopper 1 to a shaft 2 which delivers it to a horizontal plate 4 which is reciprocated horizontally. The plate 4 is connected by a rod 5 which is adjustable in a support 6, to adjust the mean position of the plate 4 below the feeding shoot 1. The material passes from the plate 4 on to the hearth, which is of saw-tooth profile, having slightly inclined surfaces 7 terminating in vertical edges 8. The hearth is supported on rollers 12, 15, and is reciprocated by a connecting rod 13 secured to a crosshead 10. The hearth is also supported at intervals by means of downwardly projecting supports 16, resting on rollers 17. The hearth may have a length up to about 60 metres. The reciprocating movement of the hearth is less than the length of each tooth, so that the material travels slowly upwards over the inclined surface in a thin layer and is turned over on falling to the next tooth. The slow travel of the material permits the heating action to be extended for several hours. The hearth forms the cover of a heating passage 19 in the furnace A. The heating is effected by combustion of gas in chambers 25, the temperature being controlled by the addition of cold gas from a pipe 26. The supply of heating gas is distributed over the length of the furnace to produce the temperature range required.

The portion of the furnace adjacent to the hopper 1 is utilised as a drying chamber, and the heating chamber below it is separated from the main heating chamber, so that cold gas may be added to the heating gases in view of the lower temperature required for drying. The cover of the furnace is constituted by double walls 31, 32 enclosing an air jacket, and pipes 33 are provided at intervals to draw off distillation products from the various zones of the furnace. Pipes are also provided for introducing oxygen-free gases into the drying



212,818

chamber to protect the material, and also to introduce superheated steam to the distillation chamber to protect the distillation gases. The heating gases may also be passed through the hearth and the material on it, either in the drying stage only, or in all stages. In such a case the inclines 7 may overlap one another to prevent the material from falling through, and to allow the upward passage of gas. The plates 7 may be shortened to increase the number of openings for the passage of gas, and in this case the hearth is inclined as a whole towards the outlet end.

NOTE.—Abstracts of the following specifications, which are now accepted, appeared in THE CHEMICAL AGE when they became open to inspection under the International Convention:—190,723 (A. A. F. M. Seigle) relating to installations and devices for the distillation and depolymerisation of liquid or liquefiable hydrocarbons, see Vol. VIII, p. 183; 198,676 (Durand and Huguenin Akt.-Ges.) relating to the manufacture of highly chlorinated hydro-aromatic products containing nitrogen, see Vol. IX, p. 156; 207,547 (Naamlooze Vennootschap Montaan Metaalhandel) relating to a process for reactivating absorption media, with the simultaneous recovery of the adsorbed products by means of electrically-generated heat, see Vol. X, p. 122; 209,706 (Soc. Chimiques des Usines du Rhone) relating to a process for the preparation of diethylchloracetamide, see Vol. X, p. 277.

International Specifications not yet Accepted

211,096. AMMONIUM CHLORIDE. O. L. Christenson, 36 B Karlbergsvagen, Stockholm. International Convention date, February 9, 1923.

Ammoniacal gas is freed from tar, heated to 100° C. and mixed with hydrochloric acid gas. The gas is then treated in a Cotterell or like apparatus or passed through settling chambers without reduction of temperature to condense the ammonium chloride but not water vapour.

211,145. SYNTHETIC TANNING AGENTS. Farbwerke vorm. Meister, Lucius and Brüning, Hoechst-on-Main, Germany. International Convention date, February 7, 1923.

Phenol aldehyde resins are treated with the alkali salts of aralkylhalide-sulphonic acids to obtain sulpho-aralkyl ethers of the resins for use as tanning agents. Alternatively, the salts mentioned may be treated with phenol or cresol, and the product condensed with an aldehyde. In an example, an aqueous solution of sodium *p*-benzylchloride-sulphonate and a caustic soda solution of cresol-paraldehyde resin are heated together, or *p*-benzylchloride sulphonate is treated with alkaline washed carbolic acid and the product treated with formaldehyde. The products are neutralised with dilute sulphuric or acetic acid, evaporated, and filtered.

211,167. ACETIC ANHYDRIDE. A. Wacker, Ges. für Elektrochemische Industrie, 20, Prinzregentenstrasse, Munich, Germany. International Convention date, February 12, 1923.

Chlorine is passed into a mixture of sulphur chloride and glacial acetic acid while cooling and stirring, until the ratio of sulphur to chlorine is 1 : 4. The mixture is then heated, and acetic anhydride is separated by distillation at ordinary or reduced pressure. The vapours may be passed into acetic acid to recover sulpur chloride and any acetyl chloride, and this acetic acid is then used as the starting material in the process. Sulphur may be used in place of sulphur chloride, in which case it is suspended in the acetic acid. The mixture of acetic acid and sulphur chloride or sulphur may be treated with chlorine in counter-current, and the product is passed continuously to a distilling apparatus. Excess of acetic acid may be used, so that a mixture of acetic acid and anhydride is obtained. The process is continuous.

LATEST NOTIFICATIONS.

213,881. Process of decolorising petroleum distillates. Union Oil Co. of California. April 4, 1923.
213,886. Manufacture of caoutchouc. K.D.P., Ltd., April 5, 1923.
213,889. Process for manufacturing vat dyes. Pereira, H. April 7, 1923.
213,895. Process for the production of sulphuric acid. Metal Traders, Ltd. April 7, 1923.
213,914. Method for producing concentrated acetic acid from aqueous solutions thereof. Fabrique de Soie Artificielle de Tubize Soc. Anon. April 4, 1923.
213,935. Process of producing activated carbon. Allgemeene Norit Maatschappij. May 26, 1922.
213,939. Process of re-activating de-colorising carbon. Allgemeene Norit Maatschappij. May 26, 1922.

Specifications Accepted, with Date of Application

186,912. Ammonia, Process and apparatus for synthesizing. Nitrogen Corporation. October 5, 1921.
194,280. Ores, particularly iron ores, Process for the direct reduction of. L. P. Basset. March 1, 1922.
198,376. Electrolytic separation with fused electrolytes. B. E. F. Rhodin. May 26, 1922.
212,233. Filtering devices, and processes for the manufacture thereof. E. H. Fouard. February 27, 1923.
213,295. Hydrocarbon oils, Process and apparatus for the molecular conversion of—and the separation of resultant products. G. P. Lewis. September 27, 1922.
213,343. Copper ores containing slimes, Leaching of. T. J. Taplin, jun., and Metals Production, Ltd. January 1, 1923.
213,363. Fuels, Carbonisation and/or gasification of. W. E. Davies. January 18, 1923.
213,438. Decolorizing earths and body colours, Process for the manufacture of. C. E. J. Goedecke. (*W. Eberlein*). April 10, 1923.
213,454. Compounded rubber, Manufacture of. W. J. Mellersh-Jackson. (*New Jersey Zinc Co.*). May 8, 1923.
213,486. Chlorine and other corrosive gases, Process of purifying. E. C. R. Marks. (*Carbide and Carbon Chemicals Corporation*). July 16, 1923.
213,493. Tanning extract, Manufacture of. W. Moeller, May 1. 1923.
213,521. Intimate mixtures of gases and liquids, Apparatus for producing. Farbenfabriken vorm. F. Bayer and Co. April 6, 1923. Addition to 199,718.

Applications for Patents

Allgemeene Norit Maatschappij and General Norit Co., Ltd. Process of producing activated carbon. 8772. April 7. (Germany, May 26, 1922).
Allgemeene Norit Maatschappij and General Norit Co., Ltd. Process of reactivating decolorising carbon. 8896, 8897. April 8. (Germany, May 26, 1922).
British Refractories Research Association and Dale, A. J. Manufacture of clay-industry products. 8935. April 8.
Defries, R., and Sorbo Rubber Sponge Products, Ltd. Manufacture of paints, varnishes, etc. 8892. April 8.
Farbenfabriken vorm. F. Bayer and Co. Process for dyeing acetate silk. 8904. April 8. (Germany, April 14, 1923).
Freeman, N. H. Centrifugal separators. 8895. April 8.
Imray, O. Y. and Soc. of Chemical Industry in Basle. Manufacture of green triphenylmethane-azo dyestuffs. 8808. April 7.
Kalle and Co., Akt.-Ges. and Sokal, S. Process for producing perylenetetracarboxylic acid or its derivatives. 8893. April 8.
Levy, L. A. Manufacture of cellulose acetate. 9057, 9058, 9059. April 9.
Lockemann, G. Manufacture of 1-phenyl-2.3-dimethyl-4-dimethylamino-5-pyrazolone. 9163 April 10. (Germany, April 10, 1923).
Potts, H. E., Stinnes, Z. M., and Weindel, A. Decomposing coal tar etc., into phenols and neutral oils. 8950. April 9.
Soc. of Chemical Industry in Basle. Manufacture of artificial resins. 8809. April 7. (Switzerland, April 9, 1923.)

Birmingham Corporation Salvage Scheme

THE BIRMINGHAM CORPORATION has just expended £100,000 on the construction of a new salvage works and destructor at Witton; and this was inaugurated on Wednesday, April 9, by the Lord Mayor of that city (Alderman T. O. Williams) in the presence of 60 salvage experts and many public men of the Midlands. The new works are a model of their kind, and new features in the plant include the electro-magnetic system for the extraction of metal from rubbish; the suction process for the removal and loading of dust and for the extraction of loose paper as the refuse travels on conveyor belts to the destructor. There are also plants for making manure and fertilisers. The manure plant has to deal with about 4,000 tons per annum of market and trade refuse, consisting principally of condemned meat and internal parts of beasts and fish. The process of detinning is also carried on, this being electro-chemical in character. The amount of tin present (on bright tin cans) is small, being only about 0·5 per cent., but its removal presents no great difficulty.

Market Report and Current Prices

Our Market Report and Current Prices are exclusive to THE CHEMICAL AGE, *and, being independently prepared with absolute impartiality by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., may be accepted as authoritative. The prices given apply to fair quantities delivered ex wharf or works, except where otherwise stated. The current prices are given mainly as a guide to works managers, chemists, and chemical engineers ; those interested in close variations in prices should study the market report.*

London, April 16, 1924.

THE market has been quietly steady during the past week, but with the approaching holidays few changes of importance are likely to occur until after business is resumed.

Continental prices generally continue to advance, and it becomes more and more apparent that a high standard of values is to be expected.

Export business is without special feature.

General Chemicals

ACETONE.—The price is well maintained, and stocks are light.

ACID ACETIC.—The firm tendency is maintained, and an advance in price is expected.

ACID CITRIC.—Unchanged.

ACID FORMIC is in short supply for early delivery ; parcels arriving are eagerly snapped up.

ACID LACTIC.—Unchanged.

OXALIC ACID.—Unchanged.

ACID TARTARIC.—Unchanged.

BARIUM CHLORIDE.—Makers are well sold for some little time ahead, and price is firm.

BLEACHING POWDER.—Unchanged.

CREAM OF TARTAR.—Advancing in price, and is in active demand.

FORMALDEHYDE is likely to improve in value.

LEAD ACETATE is scarce and firm in all near positions.

METHYL ALCOHOL is dearer.

POTASSIUM CARBONATE AND CAUSTIC.—Unchanged.

POTASSIUM PERMANGANATE is easy in tone, with little doing.

POTASSIUM PRUSSIATE is in very small demand ; the price seems to have touched bottom.

SODA SULPHIDE.—Unchanged.

SODIUM ACETATE is scarce, and prices are advancing.

SODA BICHROMATE.—Unchanged.

SODA HYPOSULPHITE.—Unchanged.

SODA NITRITE.—In very short supply, and price shows an upward tendency.

SODA PHOSPHATE.—Unchanged.

SODA PRUSSIATE.—Unchanged.

Pharmaceutical Chemicals

ACETYL SALICYLIC ACID has been in better demand, with the price tending to improve.

ACID SALICYLIC is slightly firmer.

AMIDOPYRIN continues to be offered cheaply from stocks which cannot be replaced at current prices.

BETANAPHTHOL RESUBLIMED.—Supplies are scarce, with the price tending upwards.

BROMIDES.—A few cheap parcels of potassium are still available. Ammonia has advanced.

CALCIUM LACTATE is in buyers' favour.

MERCURIALS are very firm in sympathy with the metal.

PHENACETIN.—The market is recovering from the effects of the recent cheap sales.

PHENAZONE is firmer.

SALICYLATE OF SODA is steady.

SALOL is in short supply and firm.

VANILLIN.—The demand is slow, but price is well maintained.

Coal Tar Intermediates

There has been somewhat more interest shown in this market during the last week with fair export inquiry, while prices in the main are without change.

ALPHA NAPHTHOL.—A fair inquiry has been received and the price is firm.

ALPHA NAPHTHYLAMINE is without change in price with a moderate business passing.

ANILINE OIL AND SALT have been without special feature.

BENZIDINE BASE.—Some home trade business has been placed.

BETA NAPHTHOL continues to be of interest for both home and export without change in price.

DIMETHYLANILINE.—The price is without change with fair business passing.

DIPHENYLAMINE has been inquired for on home account and the price is steady.

" H " ACID.—Some home trade business has been placed, the price being unchanged.

NITRO BENZOL has been quiet without change in value.

PARANITRANILINE has been inquired for on both home and export account.

" R " SALT is of interest in the home market.

RESORCINE continues rather scarce with some inquiry.

XYLIDINE is without special interest.

Coal Tar Products

Business in most coal tar products is fairly quiet.

90% BENZOL is hardly so strong as last week, and is worth 1s. 5½d. to 1s. 6d. per gallon on rails.

PURE BENZOL is also slightly reduced in price, and is worth about 1s. 10½d. to 1s. 11d. per gallon on rails.

CREOSOTE remains unchanged at 7¾d. per gallon on rails in the North, while the price in London is from 9d. to 9¼d. per gallon.

CRESYLIC ACID is steady, the Pale quality 97/99% being worth 2s. 1d. to 2s. 2d. per gallon on rails, while the Dark quality 95/97% is quoted at 1s. 9d. to 1s. 10d. per gallon on rails.

SOLVENT NAPHTHA is very firm at 1s. 3d. per gallon on rails.

HEAVY NAPHTHA is steady at 1s. 2d. to 1s. 3d. per gallon.

NAPHTHALENES are dull, the low qualities being worth £6 to £7 per ton, 74/76 melting point £7 10s. to £8 per ton, and 76/78 melting point from £8 10s. to £9 per ton.

PITCH is dull and prices are easier. To-day's value is 55s. to 60s. f.o.b. London ; 55s. to 57s. 6d. f.o.b. East and West Coast ports.

Sulphate of Ammonia

The demand remains satisfactory and prices are still maintained.

Chemistry House Scheme

Resolutions by Federal Council and Chemical Industry Club

AT a recent meeting of certain members of the Federal Council and of the Chemical Industry Club Committee held at the Club on Friday, March 14th, the following resolution was unanimously agreed to : " We are of opinion that the best interests of academic technical, and manufacturing chemical science will be ultimately best served by the immediate establishment of a Chemistry House on a scale involving the outlay of, say, £30,000. We are of opinion that the scheme just outlined should be regarded merely as the basis of a larger scheme for providing adequate accommodation for all the organisations representing the corporate interests of academic, technical, and manufacturing chemistry."

At a meeting of the Chemical Industry Club on Monday evening, at which this matter was also discussed, the following resolutions were adopted :—

(1) " That this meeting of the members of the Chemical Industry Club, having heard of the action taken by the executive committee on the subject of establishing a Chemistry House to date, approves such action.

(2) " The Chemical Industry Club will support any sound scheme for the establishment of Chemistry House, whether this necessitates the merging of the Club in the scheme or not, but is strongly of opinion that such scheme should be approved by the members of the constituent and associate bodies forming the Federal Council.

Current Market Prices

General Chemicals

	Per	£	s.	d.		£	s.	d.
Acetic anhydride, 90–95%	lb.	0	1	4	to	0	1	5
Acetone oil	ton	80	0	0	to	85	0	0
Acetone, pure	ton	102	10	0	to	105	0	0
Acid, Acetic, glacial, 99–100%	ton	73	0	0	to	74	0	0
Acetic, 80% pure	ton	48	10	0	to	49	0	0
Acetic, 40% pure	ton	25	0	0	to	25	10	0
Arsenic, liquid, 2000 s.g.	ton	85	0	0	to	88	0	0
Boric, commercial	ton	48	0	0	to	52	0	0
Carbolic, cryst. 39–40%	lb.	0	0	7¾	to	0	0	8
Citric	lb.	0	1	5¾	to	0	1	6
Formic, 85%	ton	63	0	0	to	64	0	0
Hydrofluoric	lb.	0	0	7	to	0	0	8
Lactic, 50 vol.	ton	37	0	0	to	39	0	0
Lactic, 60 vol.	ton	43	0	0	to	45	0	0
Nitric, 80 Tw.	ton	23	0	0	to	25	0	0
Oxalic	lb.	0	0	5½	to	0	0	5½
Phosphoric, 1.5	ton	35	0	0	to	38	0	0
Pyrogallic, cryst.	lb.	0	5	9	to	0	6	0
Salicylic, technical	lb.	0	1	9½	to	0	2	0
Sulphuric, 92–93%	ton	6	0	0	to	7	0	0
Tannic, commercial	lb.	0	2	0	to	0	2	3
Tartaric	lb.	0	1	1½	to	0	1	2
Alum, lump	ton	12	10	0	to	13	0	0
Chrome	ton	23	0	0	to	24	0	0
Alumino ferric	ton	7	0	0	to	7	5	0
Aluminium, sulphate, 14–15%	ton	7	10	0	to	8	10	0
Sulphate, 17–18%	ton	8	10	0	to	9	10	0
Ammonia, anhydrous	lb.	0	1	6	to	0	1	8
.880	ton	32	0	0	to	34	0	0
.920	ton	22	0	0	to	24	0	0
Carbonate	ton	30	0	0	to	32	0	0
Chloride	ton	50	0	0	to	55	0	0
Muriate (galvanisers)	ton	32	0	0	to	33	0	0
Nitrate (pure)	ton	40	0	0	to	45	0	0
Phosphate	ton	63	0	0	to	65	0	0
Sulphocyanide, commercial 90%	lb.	0	1	5	to	0	1	6
Amyl acetate, technical	ton	280	0	0	to	300	0	0
Arsenic, white powdered	ton	65	0	0	to	66	0	0
Barium, carbonate, Witherite	ton	5	0	0	to	6	0	0
Carbonate, Precip.	ton	15	0	0	to	16	0	0
Chlorate	ton	65	0	0	to	70	0	0
Chloride	ton	14	0	0	to	14	10	0
Nitrate	ton	37	0	0	to	40	0	0
Sulphate, blanc fixe, dry	ton	20	10	0	to	21	0	0
Sulphate, blanc fixe, pulp	ton	10	5	0	to	10	10	0
Sulphocyanide, 95%	lb.	0	0	11	to	0	1	0
Bleaching powder, 35–37%	ton	10	0	0	to	10	10	0
Borax crystals, commercial	ton	25	0	0	to		—	
Calcium acetate, Brown	ton	13	0	0	to	14	0	0
Grey	ton	20	0	0	to	21	0	0
Carbide	ton	13	0	0	to	13	10	0
Chloride	ton	5	15	0	to	6	0	0
Carbon bisulphide	ton	35	0	0	to	40	0	0
Casein technical	ton	80	0	0	to	90	0	0
Cerium oxalate	lb.	0	3	0	to	0	3	6
Chromium acetate	lb.	0	1	1	to	0	1	3
Cobalt acetate	lb.	0	6	0	to	0	6	6
Oxide, black	lb.	0	9	6	to	0	10	0
Copper chloride	lb.	0	1	1	to	0	1	2
Sulphate	ton	24	10	0	to	25	0	0
Cream Tartar, 98–100%	ton	80	0	0	to	85	0	0
Epsom salts (*see* Magnesium sulphate)								
Formaldehyde, 40% vol.	ton	65	0	0	to	66	0	0
Formusol (Rongalite)	lb.	0	1	11	to	0	2	0
Glauber salts commercial	ton	4	0	0	to	4	10	0
Glycerin crude	ton	65	0	0	to	67	10	0
Hydrogen peroxide, 12 vols.	gal	0	2	0	to	0	2	1
Iron perchloride	ton	20	0	0	to	22	0	0
Sulphate (Copperas)	ton	3	10	0	to	4	0	0
Lead acetate, white	ton	49	10	0	to	50	0	0
Carbonate (White Lead)	ton	50	0	0	to	52	0	0
Nitrate	ton	44	10	0	to	45	0	0
Litharge	ton	50	0	0	to	51	0	0
Lithophone, 30%	ton	22	10	0	to	23	0	0
Magnesium chloride	ton	4	0	0	to	4	5	0
Carbonate, light	cwt.	2	10	0	to	2	15	0
Sulphate (Epsom salts commercial)	ton	5	15	0	to	6	0	0
Sulphate (Druggists')	ton	9	0	0	to	10	0	0
Manganese Borate, commercial	ton	65	0	0	to	75	0	0
Sulphate	ton	45	0	0	to	48	0	0
Methyl acetone	ton	82	0	0	to	85	0	0
Alcohol, 1% acetone	ton	85	0	0	to	86	0	0
Nickel sulphate, single salt	ton	37	0	0	to	38	0	0
Ammonium sulphate, double salt	ton	37	0	0	to	38	0	0
Potash, Caustic	ton	32	0	0	to	33	0	0
Potassium bichromate	lb.	0	0	5¾	to		—	
Carbonate, 90%	ton	30	0	0	to	31	0	0
Chloride, 80%	ton	9	0	0	to	10	0	0
Chlorate	lb.	0	0	3½	to		—	
Metabisulphite, 50–52%	ton	63	0	0	to	65	0	0
Nitrate, refined	ton	38	0	0	to	40	0	0
Permanganate	lb.	0	0	8	to	0	0	8½
Prussiate, red	lb.	0	1	10	to	0	2	0
Prussiate, yellow	lb.	0	0	8½	to	0	0	9
Sulphate, 90%	ton	10	0	0	to	10	10	0
Salammoniac, firsts	cwt.	2	15	0	to		—	
Seconds	cwt.	2	17	6	to		—	
Sodium acetate	ton	25	0	0	to	25	10	0
Arsenate, 45%	ton	45	0	0	to	48	0	0
Bicarbonate	ton	10	10	0	to	11	0	0
Bichromate	lb.	0	0	4½	to		—	
Bisulphite, 60–62%	ton	20	0	0	to	22	0	0
Chlorate	lb.	0	0	2¾	to	0	0	3
Caustic, 70%	ton	17	10	0	to	18	0	0
Caustic, 76%	ton	18	10	0	to	19	0	0
Hydrosulphite, powder	lb.	0	1	6	to	0	1	7
Hyposulphite, commercial	ton	10	0	0	to	10	10	0
Nitrite, 96–98%	ton	29	0	0	to	30	0	0
Phosphate, crystal	ton	15	10	0	to	16	0	0
Perborate	lb.	0	0	11	to	0	1	0
Prussiate	lb.	0	0	5½	to	0	0	6
Sulphide, crystals	ton	8	10	0	to	9	0	0
Sulphide, solid, 60–62%	ton	15	0	0	to	16	10	0
Sulphite, cryst.	ton	11	10	0	to	12	0	0
Strontium carbonate	ton	50	0	0	to	55	0	0
Nitrate	ton	50	0	0	to	55	0	0
Sulphate, white	ton	6	10	0	to	7	10	0
Sulphur chloride	ton	25	0	0	to	27	10	0
Flowers	ton	11	0	0	to	11	10	0
Roll	ton	9	15	0	to	10	10	0
Tartar emetic	lb.	0	1	0	to	0	1	1
Tin perchloride, 33%	lb.	0	1	4	to	0	1	5
Perchloride, solid	lb.	0	1	5	to	0	1	6
Protochloride (tin crystals)	lb.	0	1	8	to	0	1	10
Zinc chloride 102° Tw.	ton	20	0	0	to	21	0	0
Chloride, solid, 96–98%	ton	25	0	0	to	30	0	0
Oxide, 99%	ton	42	0	0	to	45	0	0
Dust, 90%	ton	50	0	0	to	55	0	0
Sulphate	ton	15	0	0	to	16	0	0

Pharmaceutical Chemicals

	Per	£	s.	d.		£	s.	d.
Acetyl salicylic acid	lb.	0	3	6	to	0	3	10
Acetanilid	lb.	0	2	6	to	0	2	9
Acid, Gallic, pure	lb.	0	3	0	to	0	3	3
Lactic, 1.21	lb.	0	2	9	to	0	3	0
Salicylic, B.P.	lb.	0	1	10	to	0	2	0
Tannic, leviss.	lb.	0	3	0	to	0	3	3
Amidol	lb.	0	8	6	to	0	9	0
Amidopyrin	lb.	0	13	6	to	0	14	0
Ammon ichthosulphonate	lb.	0	1	10	to	0	2	0
Barbitone	lb.	0	16	0	to	0	16	6
Beta naphthol resublimed	lb.	0	3	6	to	0	4	0
Bromide of ammonia	lb.	0	0	10½	to	0	1	1
Potash	lb.	0	0	8	to	0	0	8
Soda	lb.	0	0	8½	to	0	0	9
Caffeine, pure	lb.	0	12	0	to	0	12	6
Calcium glycerophosphate	lb.	0	5	9	to	0	6	0
Lactate	lb.	0	1	6	to	0	1	9
Calomel	lb.	0	4	0	to	0	4	3
Chloral hydrate	lb.	0	3	10	to	0	4	0
Cocaine alkaloid	oz.	1	1	0	to	1	2	6
Hydrochloride	oz.	0	17	0	to	0	17	6
Corrosive sublimate	lb.	0	3	5	to	0	3	7
Eucalyptus *oil*, B.P. (70–75% eucalyptol)	lb.	0	2	0	to	0	2	2
B.P. (75–80% eucalyptol)	lb.	0	2	1	to	0	2	3
Guaiacol carbonate	lb.	0	12	9	to	0	13	0
Liquid	lb.	0	11	6	to	0	12	0
Pure crystals	lb.	0	12	6	to	0	13	0
Hexamine	lb.	0	3	9	to	0	4	0
Hydroquinone	lb.	0	4	6	to	0	5	0
Lanoline anhydrous	lb.	0	0	7	to	0	0	6
Lecithin ex ovo	lb.	1	5	0	to	1	7	6
Lithi carbonate	lb.	0	9	6	to	0	10	0
Methyl salicylate	lb.	0	2	9	to	0	3	0
Metol	lb.	0	10	6	to	0	11	6
Milk sugar	cwt.	4	0	0	to	4	5	0
Paraldehyde	lb.	0	1	5	to	0	1	7
Phenacetin	lb.	0	6	9	to	0	7	0
Phenazone	lb.	0	7	9	to	0	8	3
Phenolphthalein	lb.	0	7	3	to	0	7	6
Potassium sulpho guaiacolate	lb.	0	6	3	to	0	6	9
Quinine sulphate, B.P.	oz.	0	2	3	to		—	

	Per	£	s.	d.		£	s.	d.
Resorcin, medicinal	lb.	0	5	6	to	0	6	0
Salicylate of soda powder	lb.	0	2	6	to	0	2	9
Crystals	lb.	0	2	9	to	0	3	0
Salol	lb.	0	4	0	to	0	4	3
Soda Benzoate	lb.	0	3	0	to	0	3	3
Sulphonal	lb.	0	17	6	to	0	18	3
Terpene hydrate	lb.	0	1	9	to	0	2	0
Theobromine, pure	lb.	0	12	0	to	0	12	3
Soda salicylate	lb.	0	8	6	to	0	9	0
Vanillin	lb.	1	5	0	to	1	7	6

Coal Tar Intermediates, &c.

	Per	£	s.	d.		£	s.	d.
Alphanaphthol, crude	lb.	0	1	9	to	0	2	0
Refined	lb.	0	2	3	to	0	2	6
Alphanaphthylamine	lb.	0	1	6½	to	0	1	7
Aniline oil, drums extra	lb.	0	0	8½	to	0	0	8¾
Salts	lb.	0	0	9	to	0	0	9½
Anthracene, 40–50%	unit	0	0	8½	to	0	0	9
Benzaldehyde (free of chlorine)	lb.	0	2	9	to	0	3	0
Benzidine, base	lb.	0	4	4	to	0	4	7
Sulphate	lb.	0	3	4	to	0	3	7
Benzoic acid	lb.	0	2	0	to	0	2	3
Benzyl chloride, technical	lb.	0	2	0	to	0	2	3
Betanaphthol	lb.	0	1	1	to	0	1	2
Betanaphthylamine, technical	lb.	0	4	0	to	0	4	3
Croceine Acid, 100% basis	lb.	0	3	3	to	0	3	6
Dichlorbenzol	lb.	0	0	9	to	0	0	10
Diethylaniline	lb.	0	4	6	to	0	4	9
Dinitrobenzol	lb.	0	1	1	to	0	1	2
Dinitrochlorbenzol	lb.	0	0	10	to	0	0	11
Dinitronaphthalene	lb.	0	1	4	to	0	1	5
Dinitrotoluol	lb.	0	1	3	to	0	1	4
Dinitrophenol	lb.	0	1	6	to	0	1	7
Dimethylaniline	lb.	0	2	8	to	0	2	10
Diphenylamine	lb.	0	3	0	to	0	3	3
H-Acid	lb.	0	4	3	to	0	4	6
Metaphenylenediamine	lb.	0	4	0	to	0	4	3
Monochlorbenzol	lb.	0	0	10	to	0	1	0
Metanilic Acid	lb.	0	5	9	to	0	6	0
Metatoluylenediamine	lb.	0	4	0	to	0	4	3
Monosulphonic Acid (2.7)	lb.	0	8	6	to	0	9	6
Naphthionic acid, crude	lb.	0	2	4	to	0	2	6
Naphthionate of Soda	lb.	0	2	4	to	0	2	6
Naphthylamine-di-sulphonic-acid	lb.	0	4	0	to	0	4	3
Neville Winther Acid	lb.	0	7	3	to	0	7	9
Nitrobenzol	lb.	0	0	7	to	0	0	8
Nitronaphthalene	lb.	0	0	11½	to	0	1	0
Nitrotoluol	lb.	0	0	8	to	0	0	9
Orthoamidophenol base	lb.	0	12	0	to	0	12	6
Orthodichlorbenzol	lb.	0	1	0	to	0	1	1
Orthotoluidine	lb.	0	0	10	to	0	0	11
Orthonitrotoluol	lb.	0	0	3	to	0	0	4
Para-amidophenol, base	lb.	0	8	6	to	0	9	0
Hydrochlor	lb.	0	7	6	to	0	8	0
Paradichlorbenzol	lb.	0	0	9	to	0	0	10
Paranitraniline	lb.	0	2	6	to	0	2	8
Paranitrophenol	lb.	0	2	3	to	0	2	6
Paranitrotoluol	lb.	0	2	9	to	0	3	0
Paraphenylenediamine, distilled	lb.	0	12	0	to	0	12	6
Paratoluidine	lb.	0	5	6	to	0	5	9
Phthalic anhydride	lb.	0	2	6	to	0	2	9
Resorcin technical	lb.	0	4	0	to	0	4	3
Sulphanilic acid, crude	lb.	0	0	9	to	0	0	10
Tolidine, base	lb.	0	7	3	to	0	7	9
Mixture	lb.	0	2	6	to	0	2	9

Essential Oils and Synthetics

Essential Oils.

		£	s.	d.
Anise	c.i.f. 2/6 spot	0	2	8
Bay		0	10	6
Bergamot	dearer	0	18	0
Cajuput		0	3	3
Camphor, white	per cwt.	3	15	0
Brown	,,	3	15	0
Cassia	c.i.f. 7/6, spot	0	8	3
Cedarwood		0	1	6
Citronella (Ceylon)	c.i.f. 3/3, spot	0	3	6
(Java)	very firm, c.i.f. 4/6, spot	0	4	9
Clove		0	8	6
Eucalyptus		0	2	2
Geranium Bourbon		1	13	0
Lavender		1	5	0
Lavender Spike		0	6	0
Lemon		0	3	6
Lemongrass	per oz.	0	0	2¾
Lime (distilled)	firm	0	5	0
Orange sweet (Sicilian)		0	12	9
(West Indian)		0	9	6
Palmarosa		0	18	0
Peppermint (American)	dearer	1	1	0
Mint (dementholised Japanese)		0	18	0
Patchouli		1	2	6
Otto of Rose	per oz.	1	15	0
Rosemary		0	1	9
Sandalwood		1	5	0
Sassafras		0	10	6
Thyme	2/6 to	0	8	0

Synthetics.

		£	s.	d.
Benzyl acetate	per lb.	0	3	6
Benzoate	,,	0	3	6
Citral	,,	0	10	0
Coumarine	,,	1	0	0
Heliotropine	,,	0	8	0
Ionone	,,	1	5	0
Linalyl acetate	,,	1	2	6
Methyl salicylate	,,	0	2	6
Musk xylol	,,	1	0	0
Terpeniol	,,	0	2	9

The Moral Aspect of Industry

Address by Sir Max Muspratt

Sir Max Muspratt, of Liverpool, Vice-Chairman of the Federation of British Industries, speaking at the Conference on Christian Politics, Economics, and Citizenship on Friday, April 11, moved a series of recommendations affirming, amongst other things, that the first charge on industry should be a remuneration sufficient to maintain the worker and his family in health and dignity, that a Christian order involved a juster distribution of wealth ; and that the moral justification of the various rights constituting property depended upon the degree to which they contributed to the development of personality and the good of the whole community.

Sir Max made it clear that he could not agree with parts of the Commission's report on the problems of property and industry. The ideal had, he said, been allowed to obscure the practical. While poverty was repugnant to the Christian conscience, to deduce that the possession of great wealth was also repugnant was not justified unless there was evidence to show that the one was caused by the other. There was no such evidence. On the contrary, experience showed that the successful and wealthy industrialist set an example to the less wealthy in wages and conditions ; and nations with the largest number of wealthy men had in practice the highest all-round standard of living. Ill-spent wealth was evil, but productive wealth must be in a different category. The Commission had, he believed, failed sufficiently to emphasise the necessity for work. He held no brief for the idle rich, but because they disapproved of them, let there not also be an idle multitude. Social and industrial problems, though closely interlocked, were not the same. Clear thinking must distinguish between them and find the right remedy for both.

Problems in Handling Carboys

The Union Carboy Inclinator is the somewhat awkward name of an ingenious device, which has been brought to our notice, for handling and emptying ordinary glass carboys. The arrangement consists of a special four-wheeled truck carrying a balanced platform on which the carboy is placed. When it is desired to empty the carboy the operator simply removes the safety pin and tilts the platform, which is a particularly easy operation for the reason that it is so suspended that the centre of gravity of the carboy is below the pivots and the carboy returns to the vertical on release. The truck carrying the carboy can be readily wheeled to any point in the works where it may be required. It is claimed for this device, which is made in England and supplied by Wertheimer and White, Ltd., 64, Victoria Street, London, S.W.1, that, in addition to saving time and labour, there is much less danger of accident, through breaking of carboys or as a result of fumes inconveniencing the operator. The device is very soundly constructed and should give good service in wear and under corrosive influences. The apparatus has been known some while in the United States and been adopted by a number of manufacturers, both large and small, the total number being given as 6,000. Carboys are useful in many ways for the transport of corrosive and other liquids, but they are notoriously difficult to handle, and devices such as the above are very desirable where efficiency is of value.

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to* THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing the firm's independent and impartial opinions.

Glasgow, April 16, 1924.

THERE is no change in the position of the heavy chemical market to report this week, business being very quiet.

Prices for home manufactured material are, if anything, a little lower, but Continental quotations are advancing in most cases.

Industrial Chemicals

ACID ACETIC.—Unchanged. Glacial, 98/100%, £62 to £70 per ton; 80% pure, £51 to 53 per ton; 80% Technical, £47 to £50 per ton, all packed in casks, delivered c.i.f. U.K. port, duty free. Moderate inquiry for export.

ACID BORACIC.—Crystals or granulated, £48 per ton. Powdered, £50 per ton, carriage paid U.K. stations, minimum ton lots.

ACID CARBOLIC, ICE CRYSTALS.—Still in poor demand. Now quoted 7¾d. per lb., carriage paid.

ACID CITRIC, B.P. CRYSTALS.—Price unchanged at about 1s. 6d. per lb., less 5 per cent. carriage paid. Offered for forward delivery at slightly less.

ACID FORMIC, 85%.—Quoted £63 to £64 per ton, ex store. Offered for forward delivery at about £61 10s. per ton, c.i.f. U.K. port

ACID HYDROCHLORIC.—In little demand. Price 6s. 6d. per carboy, ex works.

ACID NITRIC 80°.—£23 10s. per ton, ex station, full truck loads.

ACID OXALIC.—Inquiry very moderate. Nominally 5½d. per lb., ex store. Offered for early delivery at 5d. per lb., c.i.f. U.K. port.

ACID SULPHURIC 144°.—£3 12s. 6d. per ton; 168°, £7 per ton, ex works, full truck loads. Dearsenicated quality, 20s. per ton more.

ACID TARTARIC, B.P. CRYSTALS.—Rather better inquiry. Now quoted 1s. 1½d. to 1s. 1¾d. per lb., less 5 per cent. ex store. Still on offer for forward delivery at 1s. 1d. per lb., less 5 per cent. ex wharf.

ALUMINA SULPHATE 17/18% iron free.—Quoted £8 2s. 6d. per ton, ex store, spot delivery.

ALUM, CHROME.—Moderate inquiry for export. Ammonium chrome alum quoted £19 to £21 per ton, according to quality, f.o.b. U.K. port. Potash chrome alum about £26 per ton, ex station.

ALUM POTASH (LUMP).—Spot lots unchanged at about £10 15s. per ton, ex store. Offered from the Continent at about £9 10s. per ton, c.i.f. U.K. port.

AMMONIA, ANHYDROUS.—Unchanged at about 1s. 5½d. per lb., ex station, prompt delivery.

AMMONIA CARBONATE.—Lump, £37 per ton, powdered, £39 per ton, packed in 5-cwt. casks, delivered U.K.

AMMONIA, LIQUID 880°.—Unchanged at 2½d. to 3d. per lb., delivered, according to quantity. Containers extra.

AMMONIA MURIATE.—Grey galvanisers' quality on offer at £30 per ton, ex station or delivered f.o.b. U.K. port. Fine white crystals offered from the Continent at about £25 15s. per ton, c.i.f. U.K. port.

AMMONIA SULPHATE.—25¼%, £13 12s. per ton; 25¾% quality, £14 15s. per ton, ex works, prompt delivery.

ARSENIC, WHITE POWDERED.—Spot lots now offered at £65 per ton, ex store, very little demand.

BARIUM CHLORIDE 98/100%.—English material slightly cheaper. Quoted £14 to £14 5s. per ton, ex store. Continental offered at £13 7s. 6d. per ton, c.i.f. U.K. port.

BARYTES.—Finest English white quoted £5 5s. per ton, ex works. Continental, about £5 per ton, c.i.f. U.K. port.

BLEACHING POWDER.—Spot lots £11 per ton, ex station. Contracts 20s. per ton less.

BORAX.—Granulated, £24 10s. per ton; crystal, £25 per ton; powdered, £26 per ton, carriage paid, U.K. stations, minimum ton lots.

CALCIUM CHLORIDE.—English material unchanged at £5 12s. 6d. per ton, ex station. Continental inclined to be dearer at about £4 12s. 6d. per ton, c.i.f. U.K. port.

COPPERAS, GREEN.—Unchanged at about £2 5s. per ton, f.o.b. U.K. port in bulk; quoted, £3 5s. to £3 10s. per ton in casks.

COPPER SULPHATE.—Unchanged at about £25 per ton, ex store. Spot lots of Continental material on offer at slightly less.

FORMALDEHYDE 40%.—Spot lots unchanged at about £63 to £64 per ton, ex store.

GLAUBER SALTS.—English material unchanged at £4 per ton, ex store or station. Continental on offer at £3 2s. 6d. per ton, c.i.f. U.K. port.

LEAD, RED.—Spot lots of Continental material nominally £41 per ton, ex store, but could probably be obtained for less.

LEAD, WHITE.—Unchanged at about £42 per ton, ex store, spot delivery.

LEAD ACETATE.—White crystals now quoted £47 to £47 5s. per ton, ex store; brown, about £1 per ton less. White crystals offered from the Continent at about £45 17s. 6d. per ton, c.i.f. U.K. port.

MAGNESITE, CALCINED.—English ground material offered at £8 per ton, ex station. Moderate inquiry for export.

MAGNESIUM CHLORIDE.—Spot material on offer at £3 15s. per ton, ex store. Offered from the Continent at £3 5s. 9d. per ton, c.i.f. U.K. port.

MAGNESIUM SULPHATE (EPSOM SALTS).—Commercial quality quoted at £5 per ton, ex store. B.P., £6 5s. per ton, ex station, prompt delivery.

POTASH CAUSTIC 88/92%.—Moderate inquiry and price unchanged at about £33 per ton, ex store, spot delivery. Offered for prompt shipment at about £31 to £31 10s. per ton, ex wharf.

POTASSIUM BICHROMATE.—Unchanged at 5¾d. per lb., delivered.

POTASSIUM CARBONATE 96/98%.—Slightly cheaper Continental offers. Now quoted £24 per ton, c.i.f. U.K. port. Spot lots, about £27 per ton, ex store. 90/94% quality unchanged at about £22 15s. to £23 per ton, c.i.f. U.K. port.

POTASSIUM CHLORATE.—Little inquiry. Offered at 3½d. per lb., ex store, spot delivery.

POTASSIUM NITRATE (SALT PETRE).—Quoted £27 15s. per ton, c.i.f. U.K. port. Spot lots unchanged at about £31 per ton, ex store.

POTASSIUM PERMANGANATE, B.P. CRYSTALS.—Now on offer at 9d. per lb., ex store, spot delivery.

POTASSIUM PRUSSIATE (YELLOW).—Quoted 8½d. to 8¾d. per lb., f.o.b. U.K. port or ex station.

SODA CAUSTIC.—76/77%, £19 7s. 6d. per ton; 70/72%, £17 17s. 6d. per ton; 60/62% broken, £19 2s. 6d. per ton; 98/99% powdered, £22 15s. per ton. All ex station, spot delivery, contracts 20s. per ton less.

SODIUM ACETATE.—Unchanged at about £25 per ton, ex store. Offered for early delivery at £23 5s. per ton, c.i.f. U.K. port.

SODIUM BICARBONATE.—Refined recrystallised quality, £10 10s. per ton, ex quay or station; M.W. quality, 30s. per ton less.

SODIUM BICHROMATE.—English makers' price unchanged at 4½d. per lb., D/d.

SODIUM CARBONATE.—Soda crystals, £5 to £5 5s. per ton, ex quay or station. Alkali 58%, £8 12s. 3d. per ton, ex quay or station.

SODIUM HYPOSULPHITE.—English material quoted £10 per ton, ex station. Continental on offer at slightly less. Pea crystals of English manufacture quoted £14 10s. per ton, ex station.

SODIUM NITRATE.—Refined, 96/98% quality, unchanged at £13 10s. to £13 15s. per ton, f.o.r. or f.o.b. U.K. port.

SODIUM NITRITE, 100%—Moderate inquiry, price about £28 per ton, f.o.b. U.K. port.

SODIUM PRUSSIATE (YELLOW).—Unchanged at about 5d. per lb., ex store. Continental material on offer at 4¾d. per lb., c.i.f. U.K. port.

SODIUM SULPHATE (SALTCAKE).—Price for home consumption, £4 5s., per ton, carriage paid stations. Good export inquiry.

SODIUM SULPHIDE.—60/65% solid, English make, £14 15s. per ton, ex station; broken, £1 per ton more; flake, £2 per ton more; 60/62% solid, offered from the Continent at £12 17s. 6d. per ton, c.i.f. U.K. port; broken, £1 per ton more; 31/34% crystals, English make, £9 2s. 6d. per ton, ex station; 30/32% crystals, Continental make, £8 17s. 6d. per ton, c.i.f. U.K. port.

SULPHUR.—Flowers, £10 per ton; Roll, £9 per ton; Rock, £9 per ton; Ground, £8 per ton. Prices nominal.

ZINC CHLORIDE 98/100% inclined to be higher. Now quoted £26 10s. per ton, f.o.b. U.K. port.

ZINC SULPHATE.—English material unchanged at about £13 10s. per ton, ex store. Offered from the Continent at £11 10s. per ton, c.i.f. U.K. port.

NOTE.—The above prices are for bulk business, and are not to be taken as applicable to small parcels.

Coal Tar Intermediates and Wood Distillation Products

ALPHA NAPHTHOL.—Fair demand. Price 2s. 4½d. per lb.

BETA NAPHTHYLAMINE SULPHATE.—Home inquiry. Price 3s. 1½d. per lb., delivered.

DIANISIDINE BASE.—Some export inquiry. Price 22s. 6d. per lb., 100% basis, f.o.b.

DIMETHYLANILINE.—Export inquiry. Price quoted 2s. 4½d. per lb., f.o.b.

ETHYL ORTHOTOLUIDINE.—Small inquiry. Price 7s. 6d. per lb., delivered.

J. ACID.—Small export inquiry. Price 2s. 10d. per lb., delivered.

PARANITRANILINE.—Some export inquiry. Price 2s. 4d. per lb., f.o.b.

SODIUM NAPHTHIONATE.—Export inquiry. Price 2s. 6d. lb., 100% basis, f.o.b.

S. ACID.—Export inquiry. Price 12s. 1d. lb., 100% basis, f.o.b.

S.S. ACID.—Export inquiry. Price 14s. 3d. lb., 100% basis, f.o.b.

TOLIDINE BASE.—Home and export inquiries. Price 6s. 11d. per lb., 100% basis.

XYLIDINE.—Small home inquiry. Price 2s. 10d. per lb., delivered.

Tariff Changes

ITALY.—The official valuations of essential oils, synthetic perfumes, alkaloids, etc., under the Italian Customs Tariff, have been revised. The revised valuations are in most cases lower than those formerly in force, and came into operation on March 29. A list giving both old and new valuations is contained in the *Board of Trade Journal*, April 10.

ARGENTINE.—The revised regulations of the Argentine Customs Tariff contains the following alterations:—Crushed barytes, or impure barium sulphate, is dutiable at the rate of 10 per cent., but pure barium sulphate for medicinal purposes (especially for radiography, at the rate of 25 per cent.; zinc oxide, iron oxide, copper sulphate, potassium bichromate and calcium chloride are dutiable at the lower rate of 5 per cent. when impure. When they are pure a duty of 25 per cent. is to be paid. (*Note*.—Zinc oxide for paints is duty free.) Lead in bars, ingots, or plates is dutiable at the general 25 per cent. rate.

Chemical Trade Inquiries

The following inquiry, abstracted from the "Board of Trade Journal," has been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the name and address of the inquirer by applying to the Department (quoting the reference number and country).

Market for Soap in Hayti

A confidential report on the market for soap in Hayti has been prepared by the Department of Overseas Trade from information received from H.M. Consul at Port-au-Prince, and issued to firms whose names are entered upon its Special Register. United Kingdom firms desirous of receiving a copy of this report together with full particulars of the Special Register service and form of application for registration should communicate with the Department of Overseas Trade, 35, Old Queen Street, London, S.W.1. Ref. No. 20,929/F.W./C.C.(2).

The Manchester Chemical Market

(FROM OUR OWN CORRESPONDENT.)

Manchester, April 16, 1924.

BUSINESS in chemicals on the Manchester market since my last report has been on quiet lines and without any very notable features. Some varieties of heavies have met with a steady demand, but in most cases trade at the best has been only moderate. Price movements also have been of a varied character. Generally speaking, values are steady, in some cases they are firm due to scarcity of spot offerings; whilst in others there is a decidedly easy tone, partly because of the poor demand, but partly also in one or two instances because of the pressure of foreign competition.

Heavy Chemicals

Glauber salts have attracted no added interest, though quotations are unchanged from last week at £3 10s. to £3 15s. per ton. Prussiate of soda has met with a limited inquiry at easy rates, to-day's value being 4¾d. to 5d. per lb. Sulphide of sodium is offering at £14 15s. for 60–65 per cent. concentrated solid and £9 5s. to £9 10s. per ton for crystals; business in this material is very slow. Alkali is being steadily called for both by home users and also for shipment; for the former 58 per cent. quality is selling at £6 15s. per ton. Chlorate of soda is inactive, and prices though unchanged from last week have an easy tendency, an average figure being 2¾d. per lb. Caustic soda is fairly active for both branches of trade, and values are well held at from £16 17s. 6d. for 60 per cent. to £19 7s. 6d. for 76–77 per cent. strength. Saltcake meets with a moderate inquiry at about £4 10s. per ton. Bicarbonate of soda is rather inactive, though values are unchanged at £10 10s. per ton. Hyposulphite of soda is in small demand at about £14 15s. for photographic crystals and £9 15s. per ton for commercial quality. Nitrite of soda is not a particularly active section, but values are firm at £28 to £28 10s. per ton on rather short supply. Bleaching powder is unchanged at £10 per ton, but only a moderate amount of business is being put through. Acetate of soda meets with a fair inquiry and prices are steady at round £24 per ton. Phosphate of soda is quiet and easy at £13 10s. per ton. Soda crystals are in moderate demand at £5 5s. per ton. Bichromate of soda is still quoted at 4½d. per lb. and meets with a quietly steady inquiry.

Caustic and carbonate of potash are fairly active and steadier again at £29 per ton for 90 per cent. caustic and £24 10s. for carbonate. Yellow prussiate of potash continues quiet and prices are easy at 8d. to 8¼d. per lb. Permanganate of potash is attracting little attention; quotations vary from 7½d. to 8½d. per lb., according to quality. Bichromate of potash keeps steady and in moderate demand at 5¾d. per lb. Chlorate of potash is rather dull, though no change in prices is to be reported, offers running from 2¾d. to 3d. per lb.

White powdered arsenic, Cornish makes, is now quoted at round £62 per ton Manchester; the demand for this material s still on a comparatively small scale. Sulphate of copper is meeting with a shade more inquiry at £24 10s. per ton, f.o.b. Grey acetate of lime is quiet but steady at £19 to £20 per ton, with brown scarce and fully maintained at last week's level of £15 per ton. Acetate of lead is also in short supply and very firmly held at £51 per ton for white and £48 for brown. Nitrate of lead is unchanged at £45 to £46 per ton and meets with a quietly steady demand. Commercial Epsom salts are steady at £4 10s. per ton for British makes, with magnesium sulphate, B.P. quality, on offer at £6 10s. per ton.

Acids and Tar Products

With the exception of acetic, the acids generally are quiet. Tartaric is now quoted at 1s. 1½d. and citric at 1s. 5d. to 1s. 5¼d. per lb. Oxalic acid is still a dull section at 5¼d. per lb. Acetic acid meets with a quietly steady demand at £47 per ton for 80 per cent. technical and round £70 for glacial.

Carbolic acid is quiet and nominally unchanged from last week at 8d. per lb. for crystal and 2s. 3d. per gallon for crude. The current demand for pitch is inactive, though some business for next season's shipment has been booked; to-day's prices continue at round £3 per ton, f.o.b. Manchester. Creosote oil is quiet and easy at 8d. per gallon. Naphthalenes keep fairly steady at £17 for refined and £7 per ton and upwards for crude qualities. Solvent naphtha is well maintained at 1s. 5d. to 1s. 6d. per gallon.

Company News

SADLER AND CO.—An interim dividend of 3 per cent. (actual) is announced on the ordinary shares.

CANADIAN EXPLOSIVES CO.—A dividend at the rate of 1¾ per cent. for the quarter ended March 31 last is announced on the 7 per cent. cumulative preferred shares.

BORAX CONSOLIDATED, LTD.—A dividend has been declared at the rate of 6 per cent. per annum, less income tax at 4s. 6d. in the £, on the preferred ordinary shares in respect of the half-year ending March 31 last.

ANTON JURGENS UNITED (MARGARINE) WORKS.—The directors announce a dividend of 6 per cent. on the preferred shares, placing 1,000,000 guilders to debenture sinking fund carrying forward 8,000,000 guilders, compared with 3,000,000 brought in. No dividend is being paid on the ordinary shares.

IDRIS HYDRAULIC TIN, LTD.—The directors have declared an interim dividend of 6d. per share in respect of the profits for the year to December 31 last, and an interim dividend of 6d. per share in respect of the profits for 1924, both payable, less tax at 4s. 6d. in the £, on April 30, to holders on the register on April 9.

TARMAC, LTD.—Presiding at the annual meeting on April 10, the chairman, Mr. E. Hickman, said that the report showed that the profit for the year amounted to £91,572. The returns for January and February this year showed a marked improvement over the corresponding months of last year. The company had more contracts at present than it ever had at the corresponding date of any previous year in its existence.

JOSEPH NATHAN AND CO., LTD.—The report of the directors for the year to September 30 last states that the available profit amounts to £11,486 and £48,287 was brought in, making a total of £59,773. After paying the year's dividend of 7 per cent. on the " A " cumulative preference share capital, absorbing £31,650, there is a balance to be carried forward of £28,123. The directors regret they cannot now recommend the payment of a dividend on the 8 per cent. cumulative participating preferred ordinary shares nor on the ordinary shares of the company. The annual general meeting will be held at Glaxo House, 56, Osnaburgh Street, London, N.W., on April 23, at noon.

LEVER BROTHERS (LIMITED).—At the annual meeting at Port Sunlight on April 10, Viscount Leverhulme referred to the magnitude of the company's interests in overseas companies, and stated that it has ever been the aim of Lever Brothers (Limited) to spread their operations over as many countries as possible. Not only had the year 1923 closed with record increases, but the prospects for 1924 were most excellent. Having just returned from a 40,000-mile journey round the world, he was much impressed with the great strength of all the associated companies in the countries visited. The position of the business as a whole was far better than that of the world's industrial position generally.

BRITISH OIL AND CAKE MILLS, LTD.—The report of the directors for the year 1923 states that the balance at the credit of profit and loss is £239,167, and £26,280 was brought in, making £265,447. Dividends have already been paid on the preference shares, £40,871, and on ordinary shares of 7½ per cent., £193,841, leaving a balance to carry forward of £30,735. The profit and loss account includes a profit of £105,968, realised by the sale of £250,000 4 per cent. funding loan and £250,000 3½ per cent. conversion loan. Out of this sum £75,000 has been set aside to extinguish the loss on the margarine business, which has been closed down, and of the balance £30,000 has been transferred to the reserve account. The ordinary general meeting will be held at Winchester House, Old Broad Street, London, on April 24 at 12.30.

RIO TINTO CO.—Lord Milner, presiding on April 10 at the annual meeting of the company, said he thought it would be found that the revenue account bore out the modest expectations of the forecast made at their last meeting. The main item, profit on sale of produce, showed an increase of £180,000, being £1,176,000 as compared with £996,000 in 1922. This result was all the more satisfactory because it had been achieved in spite of persistently low prices and adverse conditions of trade. The price of copper, which was showing such encouraging signs of improvement when they last met, soon tumbled down again, and the average price of standard for the whole of 1923 was only £65 18s. per ton. At the same time the position of the pyrites market, until nearly the end of the year, was deplorable. The prospects of their industry regarded simply as a business proposition were undoubtedly bright. What should induce caution in making optimistic forecasts was the thought of the external conditions, wholly beyond their control, which might affect them unfavourably.

New Chemical Trade Marks

Applications for Registration

This list has been specially compiled for us by Mr. H. T. P. Gee, Patent and Trade Mark Agent, 51 and 52, Chancery Lane, London, W.C.2, from whom further information may be obtained. Opposition to the Registration of the following Trade Marks can be lodged up to May 16, 1924.

" ELASTINE."

444,256. For a protective paint for iron and steel. The British Anti-fouling Composition and Paint Co., Ltd., 130, Fenchurch Street, London, E.C.3, manufacturers. January 8, 1924.

" AURASOL."

443,872. For chemical substances used for agricultural, horticultural, veterinary and sanitary purposes. British Dyestuffs Corporation, Ltd., 70, Spring Gardens, Manchester, manufacturers of dyes and chemicals. December 21, 1923.

" TRIFLUIDOL LITTLE."

445,185. For sheep dip. Morris, Little and Son, Ltd., 42, Hallgate, Doncaster, manufacturing chemists. February 7, 1923. Registration of this Trade Mark shall give no right to the exclusive use of the word " Little."

" IDIONE."

445,490. For chemical substances prepared for use in medicine and pharmacy. John Bell Hills and Lucas, Ltd., Oxford Works, 14, Tower Bridge Road, London, S.E.1, wholesale druggists. February 18, 1924.

" DANIUM."

445,491. For chemical substances prepared for use in medicine and pharmacy. John Bell Hills and Lucas, Ltd., Oxford Works, 14, Tower Bridge Road, London, S.E.1, wholesale druggists. February 18, 1924.

" PARATHAL."

445,596. For chemical substances prepared for use in medicine and pharmacy. John Bell Hills and Lucas, Ltd., Oxford Works, 14, Tower Bridge Road, London, S.E.1, wholesale druggists. February 21, 1924.

" REARGON."

445,669. For chemical substances prepared for use in medicines and pharmacy. The firm trading as Chemische Fabrik " Norgine," 178, Schwenkestrasse, Aussig, Czecho-Slovakia, manufacturers. February 25, 1924.

Lectures on Potash Fertilisers

MR. G. A. COWIE, chief agricultural adviser to the Potash Syndicate, gave a kinematograph lecture at Cullompton, Devon, on Monday, to a combined meeting of the members of several local agricultural societies, and at Crediton on Wednesday, on the advantages of potash manures. At the Cullompton meeting there was an attendance of nearly 300. Two firms illustrated the mining of potash and its manufacture into manure and the method of using finely ground kainit for killing charlock and other weeds. Mr. Cowie said that if a product could achieve the dual purpose of killing weeds and fertilising the land it had a definite advantage over products such as copper sulphate, which possessed no fertilising value, provided the cost of treatment was an economic one. He quoted many cases to show that finely ground kainit had been found not only to kill charlock but to benefit the corn crop, while in other cases the subsequent clover had also benefited from the treatment. The lectures were greatly appreciated, and it was decided to make an effort to arrange kinematograph lectures dealing with other agriculture problems next year.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

County Court Judgments

[*NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.*]

UNITED LABORATORIES AND CHEMICAL CO., LTD., 97, Queen Victoria Street, E.C., merchants. (C.C., 19/4/24.) £44 13s. 8d. January 11.

Receivership

COLEY AND WILBRAHAM, LTD. (R., 19/4/24.) A. G. Elliott, of 40, York Terrace, Regent's Park, N.W., was appointed receiver and manager on March 21, 1924, under powers contained in first mortgage debentures dated January 2, 1922.

London Gazette

Winding Up Petition

STANDAR CHEMICAL ENGINEERING CO., LTD. (W.U.P., 19/4/24.) A petition for winding up has been presented and is to be heard at the Royal Courts of Justice, Strand, London, on April 29.

Companies Winding Up

KEENE, Irving Alexander, described in the Receiving Order as the KEENE COMPANY, 52, Gray's Inn Road, London, manufacturing chemist. (A.F.D., 19/4/24.) Hearing, May 2, 11 a.m., Bankruptcy Buildings, Carey Street, London, W.C.2.

THE MAGADI SODA CO., LTD. (C.W.U., 19/4/24.) Date of order, April 8.

Bankruptcy Information

WOOD, Arthur, Grenville, Bramhall Lane, Stockport, in the county of Chester, formerly manufacturing chemist. (R.O., 19/4/24.) Receiving order, April 10. Creditor's petition.

Notice of Intended Dividend

PRESCOTT, Alfred, carrying on business as PRESCOTT AND CO., at Rutland Mills, Oswald Street, Hulme, Manchester, Drake Street, Manchester, Holt Town, Manchester, and Mill Bank, Chemical Works, Triangle, Halifax, Yorks, chemical and aniline dye manufacturer. Last day for receiving proofs, April 26. Trustee, A. R. Webb, 90, Deansgate, Manchester.

New Companies Registered

BURES DYE WORKS, LTD., dyers, bleachers, manufacturers of and dealers in chemicals, etc. Nominal capital £5,000 in £1 shares. Solicitors: Cohn, Seligman and Bax 52, New Broad Street, London, E.C.

COCKIN BROTHERS, Perseverance Mill, Brighouse, Yorks. Steam and hydraulic packing manufacturers; dyers; dealers in talc, lime, barytes, oil, grease, etc. Nominal capital, £4,000 in £1 shares.

COLD MIX MANUFACTURERS, LTD., 38, Parliament Street, London, S.W. Manufacturers of and dealers in pitch and other residual products obtained from coal, oil and other mineral substances; distillers, rectifiers and refiners of oils, manufacturers of chemicals and manures, manufacturing chemists, etc. Nominal capital, £50,000 in £1 shares (49,000 10 per cent. cumulative preferred ordinary and 1,000 deferred ordinary).

LIME AND POWER SYNDICATE, LTD., County Chambers, Corporation Street, Birmingham. Burners, producers, and manufacturers of and dealers in lime, cement or any kindred substances; chemical manufacturers and distillers, etc. Nominal capital, £2,000 in 1,500 non-cumulative 10 per cent. preference shares of £1 each and 10,000 ordinary shares of 1s. each.

Liquid Air, Ltd.

At the annual general meeting of Liquid Air, Ltd., held at their Queen's Park Works, London, on April 10, Mr. O. Simonis, in moving the adoption of the report, referred to the satisfactory progress made despite the bad times experienced in the engineering trade generally. He attributed this to the big savings the company had been able to effect for some of the larger oxygen users who installed their own production plants, despite the opposition and antagonism of the company who for many years have held a virtual monopoly of this country's oxygen supply. He suggested that an industry had an obligation to the country as well as to its pockets. Oxygen is to-day used by almost every engineering concern, and the policy of the company is definitely opposed to showing any grievance or punitive action towards the oxygen consumer who chooses to make use of the buyer's right "to go to the best and cheapest market." The general oxygen service stations in this country are the natural supply reserves to the private producer and user, just the same as is the case in other industrial countries. An increase in their number was within the company's programme, and a start has already been made at London, Southampton, and on the Firth of Forth. Such meant cheaper oxygen, which will cause increased use. This policy has already reduced the price of oxygen in various districts and has brought the company many friends, who are found amongst the subscribers to the recent new issue. The chairman invited other oxygen consumers to follow this example.

The report was duly seconded and unanimously adopted, and a dividend of 12½ per cent. was declared for the year ended December 31, 1923.

Settlement of Sulphate Case

On Wednesday morning in the King's Bench Division, before Mr. Justice Greer, Mr. Le Quesne mentioned to his Lordship the case of the British Sulphate of Ammonia Federation, Ltd. *v.* The South Metropolitan Gas Co., which related to the appropriate method of keeping accounts under the pooling system and price of equalisation system to be adopted in consequence of the War. (See The Chemical Age, December 1, p. 607.)

Mr. Le Quesne said the parties had now come to terms and those terms were endorsed upon counsel's brief, and on those terms the matter was settled.

His Lordship said the case was more satisfactorily settled by compromise than by decision.

Mr. Wyllie, for defendants, said the accountants who went nto the accounts came to the arrangement.

Alleged Infringement of Patent

Before Mr. Justice Tomlin, in the Chancery Division on Friday, April 11, a motion by the Metropolitan-Vickers Electrical Co., Ltd., of Central Buildings, Westminster, against the United Alkali Co., Ltd., of Liverpool, for an injunction restraining an infringement of patent. Mr. Moritz, for the plaintiffs, said the patent related to a combination comprising a turbine, a boiler, a condenser and a feed water heater, and the defendants had submitted to a perpetual injunction, but without any inquiry as to damages. They wished him to say, however, that their infringement was quite innocent, as they bought the plant from others, not knowing of the plaintiff's patent. His Lordship: Very well.

Fluxes and Slags in Metal Melting and Working

A general discussion on this subject is to be held on Monday, April 28, by the Faraday Society and the Institute of Metals, with the co-operation of the British Non-Ferrous Metals Research Association and the Institute of British Foundrymen. The meeting will be held from 3 p.m. to 7 p.m., with an interval for tea, at the Institution of Mechanical Engineers, Storey's Gate, S.W.1. A general introduction will be given by Professor C. H. Desch and there is a programme of some fourteen papers intended to initiate discussion on the various aspects of the subject. The papers deal primarily with the uses of fluxes and slags in the smelting and refining of the non-ferrous metals, but there will be one section dealing with fluxing problems in arc and oxy-acetylene welding. The subject of slag inclusions will also be dealt with. A copy of the complete programme may be obtained from the Secretary of the Faraday Society, 10, Essex Street, London, W.C.2.